

MBT

High Torque Synchronous Motors



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Supplemental directives

Deutsch	English	Français
▲ WARNUNG 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.
▲ WARNUNG 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.
▲ WARNUNG 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.

Deutsch	English	Français
▲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).
▲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 Verletzungsgefahr). 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.

Español	Português	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 accionamento. 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.
⚠ 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.

Español	Português	Italiano
⚠️ ATENCIÓN ¡Superficies calientes (> 60 °C)! ¡Peligro de quemaduras!	⚠️ CUIDADO Superfícies quentes (> 60 °C)! Perigo de queimaduras!	⚠️ ATTENZIONE Superfici bollenti (> 60 °C)! Pericolo di ustioni!
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).	Evite tocar superficies metálicas (p. ex. radiadores). Respeite o tempo de arrefecimento dos componentes de acionamento (mín. 15 minutos).	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!	⚠️ CUIDADO Manejo incorreto no transporte e montagem! Perigo de ferimentos!	⚠️ ATTENZIONE Manipolazione inappropriata durante il trasporto e il montaggio! Pericolo di lesioni!
Utilice dispositivos de montaje y de transporte adecuados.	Utilize dispositivos de montagem e de transporte adequados.	Utilizzare dispositivi di montaggio e trasporto adatti.
Utilice herramientas adecuadas y equipo de protección personal.	Utilize ferramentas e equipamento de proteção individual adequados.	Utilizzare attrezzi adatti ed equipaggiamento di protezione personale.
⚠️ ATENCIÓN ¡Manejo inadecuado de las pilas! ¡Peligro de lesiones!	⚠️ CUIDADO Manejo incorreto de baterias! Perigo de ferimentos!	⚠️ ATTENZIONE Utilizzo inappropriato delle batterie! Pericolo di lesioni!
No trate de reactivar o cargar pilas descargadas (peligro de explosión y cauterización).	Não tente reativar nem carregar baterias vazias (perigo de explosão e de queimaduras com ácido).	Non tentare di riattivare o ricaricare batterie scariche (pericolo di esplosione e corrosione).
No desarme ni dañe las pilas. No tire las pilas al fuego.	Não desmonte nem danifique as baterias. Não deite as baterias no fogo.	Non scomporre o danneggiare le batterie. Non gettare le batterie nel fuoco.

Svenska	Dansk	Nederlands
⚠️ VARNING Livsfara om följande säkerhetsanvisningar inte följs!	⚠️ ADVARSEL Livsfare ved manglende overholdelse af nedenstående sikkerhedsanvisninger!	⚠️ WAARSCHUWING Levensgevaar bij niet naleving van onderstaande veiligheidsinstructies!
Använd inte produkterna innan du har läst och förstått den dokumentation och de säkerhetsanvisningar som medföljer produkten, och följ alla anvisningar.	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.	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.
Kontakta din Rexroth-återförsäljare om dokumentationen inte medföljer på ditt språk.	Kontakt din Rexroth-forhandler, hvis dokumentationen ikke medfølger på dit sprog.	Mocht u niet beschikken over documenten in uw landstaal, kunt u contact opnemen met uw plaatselijke Rexroth distributiepartner.
Endast kvalificerad personal får arbeta med drivkomponenterna.	Det er kun kvalificeret personale, der må arbejde på drive components.	Uitsluitend gekwalificeerd personeel mag aan de aandrijvingscomponenten werken.
Se kapitel 1 i denna dokumentation för närmare beskrivningar av säkerhetsanvisningarna.	Nærmere forklaringer til sikkerhedsanvisningerne fremgår af kapitel 1 i denne dokumentation.	Meer informatie over de veiligheidsinstructies vindt u in hoofdstuk 1 van deze documentatie.

Svenska	Dansk	Nederlands
▲VARNING Hög elektrisk spänning! Livsfara genom elchock!	▲ADVARSEL Elektrisk højspænding! Livsfare på grund af elektrisk stød!	▲WAARSCHUWING Hoge elektrische spanning! Levensgevaar door elektrische schok!
Använd endast drivkomponenterna med fastmonterad skyddsledare.	Drive components må kun benyttes med et fast installeret jordstik.	Bedien de aandrijvingscomponenten uitsluitend met vast geïnstalleerde aardleiding.
Koppla bort spänningsförsörjningen före arbete på drivkomponenter.	Sørg for at koble spændingsforsyningen fra, inden du rører ved drive components.	Schakel voor toegang tot aandrijvingscomponenten de spanningsvoorziening uit.
Var medveten om kondensatorernas urladdningstid.	Overhold kondensatorernes afladningstider.	Neem de ontladtid van condensatoren in acht.
▲VARNING Farliga rörelser! Livsfara!	▲ADVARSEL Farlige bevægelser! Livsfare!	▲WAARSCHUWING Risicovolle bewegingen! Levensgevaar!
Uppehåll dig inte inom maskiners och maskinellers rörelseområde.	Du må ikke opholde dig inden for maskiners og maskinellers bevægelsesradius.	Houdt u niet op in het bewegingsbereik van machines en machineonderdelen.
Förhindra att obehöriga personer får tillträde.	Sørg for, at ingen personer kan få utilsigtet adgang.	Vorkom dat personen onbedoeld toegang verkrijgen.
Innan du börjar arbeta eller vistas inom drivsystemets riskområde måste maskinen vara stillastående.	Stands drevene helt, inden du rører ved drevene eller træder ind i deres fareområde.	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!	▲ADVARSEL Elektromagnetiske/magnetiske felter! Sundhedsfare for personer med pacemakere, metalliske implantater eller høreapparater!	▲WAARSCHUWING Elektromagnetische / magnetische velden! Gevaar voor de gezondheid van personen met pacemakers, metalen implantaten of hoorapparaten!
Det är förbjudet för ovan nämnda personer (eller kräver överläggning med läkare) att beträda områden där drivkomponenter är monterade och i drift.	For disse personer er der adgang forbudt eller kun adgang med tilladelse fra læge til de områder, hvor drive components monteres og drives.	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!	▲FORSIGTIG Varme overflader (> 60 °C)! Risiko for forbrændinger!	▲VOORZICHTIG Hete oppervlakken (> 60 °C)! Verbrandingsgevaar!
Undvik att vidröra metallytor (t.ex. kylelement). Var medveten om att det tar tid för drivkomponenterna att svalna (minst 15 minuter).	Undgå at berøre metaloverflader (f.eks. køleelementer). Overhold drive components nedkølingstid (min. 15 min.).	Vorkom contact met metalen oppervlakken (bijv. Koellichamen). Afkoeltijd van de aandrijvingscomponenten in acht nemen (min. 15 minuten).
▲OBSERVERA Felaktig hantering vid transport och montering! Skaderisk!	▲FORSIGTIG Fejlhåndtering ved transport og montering! Risiko for kvæstelser!	▲VOORZICHTIG Onjuist gebruik bij transport en montage! Letselgevaar!
Använd passande monterings- och transportanordningar.	Benyt egnede monterings- og transportanordninger.	Gebruik geschikte montage- en transportinrichtingen.
Använd lämpliga verktyg och personlig skyddsutrustning.	Benyt egnet værktøj og personligt sikkerhedsudstyr.	Gebruik geschikt gereedschap en een persoonlijke veiligheidsuitrusting.

Svenska	Dansk	Nederlands
▲ OBSERVERA Felaktigt hantering av batterier! Skaderisk!	▲ FORSIGTIG Fejlhåndtering af batterier! Risiko for kvæstelser!	▲ VOORZICHTIG Onjuist gebruik van batterijen! Letselgevaar!
Försök inte återaktivera eller ladda upp batterier (risk för explosioner och frätskador).	Forsøg ikke at genaktivere eller oplade tomme batterier (eksplosions- og ætsningsfare).	Probeer nooit lege batterijen te reactiveren of op te laden (explosiegevaar en gevaar voor beschadiging van weefsel door cauterisatie).
Batterierna får inte tas isär eller skadas. Släng inte batterierna i elden.	Undlad at skille batterier ad eller at beskadige dem. Smid ikke batterier ind i åben ild.	Batterijen niet demonteren of beschadigen. Nooit batterijen in het vuur werpen.

Suomi	Polski	Český
▲VAROITUS Näiden turvaohjeiden noudattamatta jättämisestä on seurauksena hengenvaara!	▲OSTRZEŻENIE Zagrożenie życia w razie nieprzestrzegania poniższych wskazówek bezpieczeństwa!	▲VAROVÁNÍ Nebezpečí života v případě nedodržení níže uvedených bezpečnostních pokynů!
Ota tuote käyttöön vasta sen jälkeen, kun olet lukenut läpi tuotteen mukana toimitetut asiakirjat ja turvallisuusohjeet, ymmärtänyt ne ja ottanut ne huomioon.	Nie uruchamiać produktów przed uprzednim przeczytaniem i pełnym zrozumieniem wszystkich dokumentów dostarczonych wraz z produktem oraz wskazówek bezpieczeństwa.	Před uvedením výrobků do provozu si přečtěte kompletní dokumentaci a bezpečnostní pokyny dodávané s výrobkem, pochopte je a dodržujte.
Jos asiakirjoja ei ole saatavana omalla äidinkielläsi, ota yhteys asianomaiseen Rexrothin myyntiedustajaan.	Należy przestrzegać wszystkich zawartych tam zaleceń.	Nemáte-li k dispozici podklady ve svém jazyce, obraťte se na příslušného obchodního partnera Rexroth.
Käyttölaitteiden komponenttien parissa saat työskennellä ainoastaan valtuutettu henkilöstö.	W przypadku braku dokumentów w Państwa języku, prosimy o skontaktowanie się z lokalnym partnerem handlowym Rexroth.	Na komponentách pohonu smí pracovat pouze kvalifikovaný personál.
Lisätietoa turvaohjeista löydät tämän dokumentaation luvusta 1.	Przy zespołach napędowych może pracować wyłącznie wykwalifikowany personel.	Podrobnější vysvětlení k bezpečnostním pokynům naleznete v kapitole 1 této dokumentace.
	Blíže objasnění ukazovek bezpečnosti naleznete v kapitole 1 této dokumentace.	
▲VAROITUS Voimakas sähköjännite! Sähköiskun aiheuttama hengenvaara!	▲OSTRZEŻENIE Wysokie napięcie elektryczne! Zagrożenie życia w wyniku porażenia prądem!	▲VAROVÁNÍ Vysoké elektrické napětí! Nebezpečí života při zasažení elektrickým proudem!
Käytä käyttölaitteen komponentteja ainoastaan maadoitusjohtimen ollessa kiinteästi asennettuna.	Zespoły napędu mogą być eksploatowane wyłącznie z zainstalowanym na stałe przewodem ochronnym.	Komponenty pohonu smí být v provozu pouze s pevně nainstalovaným ochranným vodičem.
Katkaise jännitteensyöttö ennen käyttölaitteen komponenteille suoritettavien töiden aloittamista.	Przed uzyskaniem dostępu do podzespołów napędu należy odłączyć zasilanie elektryczne.	Než začnete zasahovat do komponent pohonu, odpojte je od elektrického napájení.
Huomioi kondensaattoreiden purkausajat.	Zwracać uwagę na czas rozładowania kondensatorów.	Dodržujte vybijací časy kondenzátorů.

Suomi	Polski	Český
▲VAROITUS Vaarallisia liikkeitä! Hengen- vaara! Älä oleskele koneiden tai koneenosien liike- alueella. Pidä huolta siitä, ettei muita henkilöitä pääse alueelle vahingossa. Pysäytä käyttölaitteet varmasti ennen vaara- alueelle koskemista tai menemistä.	▲OSTRZEŻENIE Niebezpieczne ruchy! Zagro- żenie 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. Před zásahem nebo vstupem do nebezpečného prostoru bezpečně zastavte pohony.
▲VAROITUS Sähkömagneettisia/magneet- tisia kenttiä! Terveystieteiden haittojen vaara hen- kilöille, joilla on sydämentahdistin, metallinen implantti tai kuulolaite! Yllä mainituilta henkilöiltä on pääsy kielletty alueille, joilla asennetaan tai käytetään käyttö- laitteen komponentteja, tai heidän on ensin saa- tava 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 eks- ploatacja napędów jest dla ww. osób zabroniony względnie dozwolony po konsultacji z lekarzem.	▲VAROVÁNÍ Elektromagnetická/magnetická pole! Nebezpečí pro zdraví osob s kardiostimulá- tory, kovovými implantáty nebo naslouchadly! Výše uvedené osoby mají zakázán přístup do prostorů, kde jsou montovány a používány kom- ponenty pohonu, resp. ho mají povolen pouze po poradě s lékařem.
▲HUOMIO Kuumia pintoja (> 60 °C)! Palo- vammojen vaara! Vältä metallipintojen koskettamista (esim. jääh- dytyslevyt). Noudata käyttölaitteen komponent- tien jäähtymisaikojia (väh. 15 minuuttia).	▲PRZESTROGA Gorące powierzchnie (> 60 °C)! Niebezpieczeństwo poparzenia! Unikać kontaktu z powierzchniami metalowymi (np. radiatorami). Przestrzegać czasów schład- zania podzespołów napędów (min. 15 minut).	▲UPOZORNĚNÍ Horké povrchy (> 60 °C)! Nebezpečí popálení! Nedotýkejte se kovových povrchů (např. chladi- cích těles). Dodržujte dobu ochlazení komponent pohonu (min. 15 minut).
▲HUOMIO Epäasianmukainen käsittely kulje- tuksen ja asennuksen yhteydessä! Loukkaantu- misvaara! Käytä soveltuvia asennus- ja kuljetuslaitteita. Käytä omia työkaluja ja henkilökohtaisia suoja- varusteita.	▲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 Paristojen epäasianmukainen käsitteily! Loukkaantumisvaara! Älä yritä saada tyhjiä paristoja toimimaan tai ladata niitä uudelleen (räjähdys- ja syöpymis- vaara). Älä hajota paristoja osiin tai vaurioita niitä. Älä heitä paristoja tuelle.	▲PRZESTROGA Niewłaściwe obchodzenie się z bateriami! Ryzyko urazu! Nie próbować reaktywować i nie ładować zuży- tych baterii (niebezpieczeństwo wybuchu oraz poparzenia żrącą substancją). Nie demontować i nie niszczyć baterii. Nie wrzucać baterii do ognia.	▲UPOZORNĚNÍ Nesprávné zacházení s bater- iemi! Nebezpečí zranění! Nepokoušejte se znovu aktivovat nebo dobíjet prázdné baterie (nebezpečí výbuchu a pole- ptání). Nerozebírejte ani nepoškozujte baterie. Neházejte baterie do ohně.

Slovensko	Slovenčina	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.	⚠ VAROVANJE Nevarnost ohrotenja života pri nedodrževanju naslednjih varnostnih priporočil! 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. Blížšie 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 fikсно nameščenim zaščitnim vodnikom. Pred dostopom do pogonske komponente odklopite napajanje. Upošteвайте čase praznjenja kondenzatorjev.	⚠ VAROVANJE Vysoké elektrické napätie! Nebezpečenstvo 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 Nevarni premiki! 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.	⚠ VAROVANJE Pohyby prinášajúce nebezpečenstvo! Nebezpečenstvo ohrozenia života! Nezdržujte sa v oblasti pohybu strojov a časti 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.
⚠ OPOZORILO Elektromagnetna / magnetna polja! Nevarnost za zdravje za osebe s spodnjevalniki 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.	⚠ VAROVANJE Elektromagnetické/magnetické polia! Nebezpečenstvo pre zdravie osôb s kardiostimulátormi, kovovými implantátmi alebo načúvacími prístrojmi! Prístup k oblastiam, v ktorých sú namontované a Intraerea în zone, în care se montează sau se prevádzkujú sa komponenty pohonu, je pre hore exploatează componente de acționare, este interzisă pentru persoanele sus numite respectiv este permisă numai cu acordul medicului.	⚠ AVERTIZARE Câmpuri electromagnetice / magnetice! Pericol pentru sănătatea persoanelor cu stimulatoare cardiace, implanturi metalice sau aparate auditive!

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▲ POZOR Vroče površine (> 60 °C)! Nevarnost opeklin! Izogibajte se stiku s kovinskimi površinami (npr. hladilnimi telesi). Upošteвайте čas hlajenja pogonskih komponent (najm. 15 minut). ▲ POZOR Nestrokovno ravnanje med transportom in namestitvijo! Nevarnost poškodb! Uporabljajte ustrezne pripomočke za nameščanje in transport. Uporabite ustrezno orodje in osebno zaščitno opremo. ▲ POZOR Nepravilno ravnanje z baterijami! Nevarnost poškodb! Ne poskušajte ponovno aktivirati ali napolniti praznih baterij (Nevarnost zaradi eksplozij ali jedkanja). Ne razstavljajte ali poškodujte nobenih baterij. Baterij ne mečite v ogenj.	▲ UPOZORNENIE Horúce povrchy (> 60 °C)! Nebezpečnosť popálenia! Zabráňte kontaktu s kovovými povrchmi (napr. chladiacimi telesami). Dodržiavajte čas vychladenia komponentov pohonu (min. 15 minút). ▲ UPOZORNENIE Neodborná manipulácia pri transporte a montáži! Nebezpečnosť poranenia! Používajte vhodné montážne a transportné zariadenia. Používajte vhodné náradie a osobné ochranné prostriedky. ▲ UPOZORNENIE Neodborná manipulácia s batériami! Nebezpečnosť poranenia! Nepokúšajte sa reaktivovať alebo nabíjať prázdne batérie (nebezpečnosť výbuchu a poleptania). Batérie nerozoberajte ani nepoškodujte. Nehádzte batérie do ohňa.	▲ 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). ▲ 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. ▲ ATENȚIE Manipulare necorespunzătoare a bateriilor! Pericol de vătămare! Nu încercați să reactivați sau să încărcati bateriile goale (pericol de explozie și pericol de arsuri). Nu dezasamblați și nu deteriorați bateriile. Nu aruncați bateriile în foc.

Magyar	Български	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 nyelvéen 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 по-долу 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.	▲ BRĪDĪNĀJUMS Turpinājumā doto drošības norādījumu neievērošana var apdraudēt dzīvību! Sāciet lietot izstrādājumu tikai pēc tam, kad esat pilnībā izlasījuši, sapratuši un ņēmuši vērā kopā 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.

Magyar	Български	Latviski
▲ 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.
▲ 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, fémbeültetéssel 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.
▲ VIGYÁZATI! 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! Neskarīeties pie metāliskām virsmām (piemēram, dzesētāja). Ļaujiet piedziņas komponentiem atdzist (min. 15 minūtes).
▲ VIGYÁZATI! Szakszerzőtlen 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 аlos aizsardzības līdzekļus.	▲ UZMANĪBU! Nepareizi veikta transportēšana un montāža! Traumu gūšanas risks! Izmantojiet piemērotas montāžas un transportēšanas ierīces. Izmantojiet piemērotus instrumentus un individuālos aizsardzības līdzekļus.

Magyar	Български	Latviski
▲ VIGYÁZAT! Akkumulátorok szakszerűtlen kezelése! Sérülésveszély!	▲ ВНИМАНИЕ! Неправилно боравене с батерии! Опасност от нараняване!	▲ UZMANĪBU! Nepareiza bateriju lietošana! Traumu gūšanas risks!
Üres akkumulátorokat ne aktiváljon újra, illetve ne töltsön fel (robbanás- és marásveszély)!	Не се опитвайте да активирате отново или да зареждате разредени батерии (Опасност от експлозия и напръскване с агресивен агент).	Neméginiet ne jauna aktivizēt vai uzlādēt tukšas baterijas (eksplodziju un ķīmisko apdegumu draudi).
Az akkumulátorokat ne szedje szét, és ne rongálja meg! Az akkumulátort ne dobja tűzbe!	Не разглобявайте и не повреждайте батерии. Не хвърляйте батерии в огън.	Neizjauciet un nesabojājiyet baterijas. Nemetiet baterijas ugunī.

Lietuviškai	Eesti	Ελληνικά
▲ SPĖJIMAS! Pavojus gyvybei nesilaikant toliau pateikiamų saugumo nurodymų!	▲ HOIATUS! Alljärgnevat ohutusjuhiste eiramine on eluohtlik!	▲ ΠΡΟΕΙΔΟΠΟΙΗΣΗ! Κίνδυνος θανάτου σε περίπτωση μη συμμόρφωσης με τις παρακάτω οδηγίες ασφαλείας!
Naudokite gaminį tik kruopščiai perskaitę prie jo pridėtus aprašus, saugumo nurodymus. Susipažinkite su jais ir vadovaukitės naudodami gaminį.	Võtke tooted käiku alles siis, kui olete toodetega kaasaolevad materjalid ning ohutusjuhised täielikult läbi lugenud, neist aru saanud ja neid järginud.	Θέστε το προϊόν σε λειτουργία αφού διαβάσετε, κατανοήσετε και λάβετε υπόψη το σύνολο των οδηγιών ασφαλείας που το συνοδεύουν.
Jei Jūs negavote aprašo gimtąja kalba, kreipkitės į jgaliotus Rexroth atstovus.	Kui Teil puuduvad emakeelsed materjalid, siis rõõrduge Rexrothi kohaliku müügiesinduse poole.	Εάν δεν υπάρχει τεκμηρίωση στη γλώσσα σας, απευθυνθείτε σε εξουσιοδοτημένο αντιπρόσωπο της Rexroth.
Prie pavaros komponentų leidžiama dirbti tik kvalifikuotam personalui.	Ajamikomponentidega tohib töötada üksnes kvalifitseeritud personal.	Μόνο εξειδικευμένο προσωπικό επιτρέπεται να χειρίζεται στοιχεία μετάδοσης κίνησης.
Išsamesnius saugumo nurodymų paaiškinimus rasite šios dokumentacijos 1 skyriuje.	Täpsemad selgitusi ohutusjuhiste kohta leiate käesoleva dokumentatsiooni peatükist 1.	Περαιτέρω επεξηγήσεις των οδηγιών ασφαλείας διατίθενται στο κεφάλαιο 1 της παρούσας τεκμηρίωσης.

▲ SPĖJIMAS! Aukšta elektros įtampa! Pavojus gyvybei dėl elektros smūgio!	▲ HOIATUS! Kõrge elektripinge! Eluohtlik elektrilöögi tõttu!	▲ ΠΡΟΕΙΔΟΠΟΙΗΣΗ! Υψηλή ηλεκτρική τάση! Κίνδυνος θανάτου από ηλεκτροπληξία!
Pavaros komponentus eksploatuokite tik su fiksuotai instaliuotu apsauginiu laidu.	Käitage ajamikomponente üksnes püsivalv installleeritud maandusega.	Θέτετε σε λειτουργία τα στοιχεία μετάδοσης κίνησης μόνο εφόσον έχει τοποθετηθεί καλά προστατευτικός αγωγός γείωσης.
Prieš priedami prie pavaros komponentų išjunkite maitinimo įtampą.	Lülitage enne ajamikomponentidega tööde alustamist toitepinge välja.	Πριν από οποιαδήποτε παρέμβαση, αποσυνδέστε την τροφοδοσία των στοιχείων μετάδοσης κίνησης.
Atsižvelkite į kondensatorių išsikrovimo trukmę.	Järgige kondensaatorite mahalaadumisaegu.	Λάβετε υπόψη τους χρόνους αποφόρτισης των πυκνωτών.

▲ SPĖJIMAS! Pavojingi judesiai! Pavojus gyvybei!	▲ HOIATUS! Ohtlikud liikumised! Eluohtlik!	▲ ΠΡΟΕΙΔΟΠΟΙΗΣΗ! Επικίνδυνες τάσεις! Κίνδυνος θανάτου!
Nebūkite mašinų ar jų dalių judėjimo zonoje.	Ärge viibige masina ja masinaosade liikumiskiirikkonnas.	Μην στέκεστε στην περιοχή κίνησης μηχανημάτων και εξαρτημάτων.
Neleiskite netyčia patekti asmenims.	Tõkestage inimeste ettekatvematut sisenevaid masina ja masinaosade liikumiskiirkonda.	Αποτρέπετε την τυχαία είσοδο ατόμων.
Prieš patekdami į pavojaus zoną saugiai išjunkite pavaras.	Tagage ajamite turvaline seiskamine enne ohupiirkonda juurdepääsu või sisenevaid.	Πριν από την παρέμβαση ή πρόσβαση στην περιοχή κινδύνου, μεριμνήστε για την ασφαλή ακινητοποίηση των συστημάτων μετάδοσης κίνησης.

Lietuviškai	Eesti	Ελληνικά
▲ISPĖJIMAS 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 ajami-komponentide monteerimine ja käitamine, on ülalnimetatud isikutele keelatud või lubatud üksnes pärast arstiga konsulteerimist.	▲ΠΡΟΕΙΔΟΠΟΙΗΣΗ Ηλεκτρομαγνητικά/ μαγνητικά πεδία! Κίνδυνος για την υγεία απόρων 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)! Nudėgimo pavojus! Venkite liesti metalinius paviršius (pvz., radiatorų). Išlaikykite pavaros komponentų atvėsimą trukmę (bent 15 minučių).	▲ETTEVAATUST Kuumad välispinnad (> 60 °C)! Põletusohut! Vältige metallsete välispindade (nt radiaatorid) puudutamist. Pidades kinni ajamikomponentide mahajahutumisajast (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).
▲PERSPĖJIMAS Netinkamas darbas transportuojant ir montuojant! Susižalojimo pavojus! Naudokite tinkamus montavimo ir transportavimo įrenginius. Naudokite tinkamus įrankius ir asmens saugos priemones.	▲ETTEVAATUST Asjatundmatu käsitemine transportimisel ja montaažil! Vigastusohut! 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 išsėdinimo pavojus). Neardykite ir nepažeiskite baterijų. Nemeskite baterijų į ugnį.	▲ETTEVAATUST Patareide asjatundmatu käsitemine! Vigastusohut! Ärge üritage kunagi tühje patareisid reakti-veerida või täis laadida (plahvatus- ja söövitushoht). 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.

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。

中文

▲警告 危险运动！生命危险！

保证设备的运动区域内和移动部件周围无障碍物。

防止人员意外进入设备运动区域内。

在接近或进入危险区域之前，确保传动设备安全停止。

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

上述人员禁止进入安装及运行的驱动器区域，或者必须先咨询医生。

▲小心 热表面(大于 60 度)！灼伤风险！

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

▲小心 安装和运输不当导致受伤危险！当心受伤！

使用适当的运输和安装设备。

使用适合的工具及用适当的防护设备。

▲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 or motor components of a kit motor.

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

1.2 Editions of this documentation

Table 1: Record of revisions

Edition	Release date	Notes
04	01/2024	Revision and amendment of assembly notes
03	07/2021	Revision and amendment of new frame sizes and windings Amendment of MBTxx1 series
02	06/2012	Multi lingual safety notes and information about motor connection cables amended
01	02/2012	First edition

1.3 Additional documentation

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

Table 2: Additional documentation

Title	Document type	Document number
 MBT High Synchronous Torque Motors	Project Planning Manual	DOK-MOTOR*-MBT*****-PR□□-□□-P ➔ R911298798
 Rexroth Connection Cable	Selection Data	DOK-CONNEC-CABLE*INDRV-AU□□-□□-P ➔ R911322949
 Rexroth Connection System, Assembly and Tools	Assembly Instructions	DOK-CONNEC-CAB*INSTR02-MA□□-□□-P ➔ R911286117
 Electromagnetic Compatibility (EMC) in Drive and Control Systems	Project Planning Manual	DOK-GENERL-EMV*****-PR□□-□□-P ➔ R911259814
 Documentation about special products are available on demand.		

1.4 Presentation of information

Explanation of signal words and the safety alert symbol

The Safety Instructions in the available application documentation contain specific signal words (DANGER, WARNING, CAUTION or NOTICE) and, where required, a safety alert symbol (in accordance with ANSI Z535.6-2011).

The signal word is intended to draw your attention to the safety instructions and describes the seriousness of the danger.

The safety alert symbol (a triangle with an exclamation point), which precedes the signal words DANGER, WARNING and CAUTION, is used to alert the reader to personal injury hazards.

 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.

Table 3: Symbols

Symbol	Meaning
	Reference to supplementary documentation
	This note gives important information, which must be observed.
	Single, independent handling step
1.	Numbered instruction:
2.	The numbers show that the action steps must be taken one after the other.
3.	
	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.

Markup

The following markups are used for a user-friendly text information representation:

 Reference to supplementary documentation



This note gives important information, which must be observed.

- Listings on the first level contain a bullet point
 - Listings on the second level contain a dash

➔ Handling instructions are specified in numbered lists. Please comply with the order of the handling instructions.

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 Important directions on use

2.2.1 Intended use

Introduction

Bosch Rexroth products are designed and manufactured using the latest state-of-the-art-technology. The products are tested prior to delivery to ensure operational safety and reliability.

⚠ WARNING

Personal injury and property damage by using products incorrectly!

Failure to use our products in an unintended way may cause situations resulting in property damage and personal injury.

NOTICE

Inappropriate use

Bosch Rexroth, as the manufacturer, does not provide any warranty, assume any liability, or pay any damages for damage caused by products not being used as intended. Any risks resulting from the products not being used as intended are the sole responsibility of the user.

Before using the products by Bosch Rexroth, the following condition precedent must be fulfilled so as to ensure that they are used as intended:

- Personnel that in any way uses our products must first read and understand the relevant safety instructions and be familiar with their appropriate use.
- Hardware products must be left in their original condition, i.e. no structural changes may be made. Software products must not be decompiled and their source code must not be changed.

- Damaged or defective products must not be installed or put into operation.
- It must be ensured that products are installed in compliance with all regulations specified in the documentation.

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

Areas of use and application

Typical applications include, for example:

- Handling and mounting systems
- Packaging and food machines
- Printing and paper converting machines
- Machine tools

The motors have been exclusively designed for installation in industrial machinery. The motors have been designed and manufactured in compliance with the EU directives and harmonized standards specified in the following.

Standards	
EN 60034-1 EN 60034-1:2010 + Cor.:2010	Rating and performance behavior
EN 60034-5 EN IEC 60034-5:2020	Type of protection

Directives	
2014/35/EU	Low voltage directive

The machine manufacturer must evaluate the electric and mechanic safety as well as environmental influences in the assembled state of the machine according to the Machine Directive 2014/35/EC EN 60204-1:2018 (Safety of machinery - Electrical equipment of machines -Part 1: General requirements).

The electrical installation must comply with the protection requirements of EMC Directive 2014/30/EU. The plant manufacturer is responsible for appropriate installation (for example: physical separation of signal and power cables, using shielded cables, ...). The EMC instructions of the converter manufacturer must be observed.

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

For application-specific use of motors, drive controllers with various levels of power, DC bus voltage and different interfaces are available. For regulation and controlling of motors, additional sensors like length measuring systems must be connected.

Before commissioning, every connected drive controller must be programmed according to the specified motor function for the specified application.



- The motors may only be operated under the assembly, mounting and installation conditions, in the normal position, and under the environmental conditions (temperature, degree of protection, humidity, EMC etc.) specified in this documentation.
- The motors may only be used with the accessories and attachments specified in this documentation. Components that are not explicitly specified must not be installed nor connected. The same applies for cables and lines.
- The device may only be operated in the explicitly specified configurations and combination of components and in compliance with the respective functional description of the software and firmware.

2.2.2 Unintended use

Any use of motors outside of the fields of application mentioned above or under operating conditions and technical data other than those specified in this documentation is considered as "non-intended use".

Do not use these motors, if

- the intended application range is not explicitly approved for Bosch Rexroth motors.
- the operating conditions do not comply with the specified ambient conditions. For example, they may not be operated under water, under extreme temperature fluctuations, under extreme maximum temperatures or in potentially explosive atmospheres.



These motors are not suited to be operated directly on the power supply.

Trademark right third parties

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

2.3 Qualification of personnel

Any work with or on the described product may only be done by qualified or skilled personnel. For the purpose of this manual, qualified personnel means persons who are familiar with transporting, installing, mounting, commissioning and operating the components of the electrical drive and control system and the associated hazards and have an appropriate qualification for their job.

All persons working on, with or in the vicinity of an electrical system must be informed of the relevant safety requirements, safety guidelines and internal instructions EN 50110-1:2013.

2.4 General safety instructions

Important! Please read all instructions before motor installation.

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

Keep this instructions!

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

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

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

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

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

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

2.5 Product- and technology-dependent safety instructions

2.5.1 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:

- Enable.
- Secure against reactivation.
- Ensure de-energization.
- Ground and short-circuit.
- 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.

2.5.2 Protection from mechanical danger

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

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

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

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

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

2.5.3 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 certain 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).

Electro magnetic and magnetic fields!

Observe the country-specific regulations. For Germany, please observe the specifications of the occupational insurance association BGV B11 and BGR B11 regarding "electromagnetic 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 electromagnetic 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 forces of the permanent magnets influence all magnetizable materials. Especially in an area < 100 mm, the attractive forces rise. Loose or not fastened components made of magnetizable materials can abruptly and inadvertently attracted with the permanent magnets.

- 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).

- Do not unpack several motor components with permanent magnets or directly place them side by side at your working space.
- Unpack single motor components with permanent magnets immediately prior mounting and mount them immediately.
- 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.

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).
- Separate inherent parts via emergency tools to loose clamped body parts, like fingers, hand, foot, for example.
 - Therefore, beat the wedges with a hammer into the cutting slit to free the caught body parts.

2.5.4 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 2.5.3 “Protection against magnetic and electromagnetic fields” on page 24.

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

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

Observe the following instructions during unpacking and handling.

- Instruct the personal with regard to the danger.
- Use personal safety equipment (e.g. protective gloves, protective glasses).
- Store all components in its origin package until assembly and for transport.
- Do only work on clean working spaces in which no ferromagnetic parts exist.

- If possible, use non-magnetic tools, e.g. made from aluminum or brass.
- Remove only one motor component from the package and secure it on your working space against slipping, rolling away.

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

Store the original package of the motor components with permanent magnets

Store the original package for later use.

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

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

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

2.5.5 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 motors to cool down long enough before touching them.
- Temperature-sensitive components may not come into contact with the motor surface. Ensure appropriate mounting distance of connection cables and other components.

2.5.6 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 pomponents 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 (2 pcs.)
- 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.

Table 4: O-rings (only for cooling mode “liquid cooling”)

O-ring for stator	Material number R911...	(Amount)
MST130	R911306474	2
MST160	R911306476	
MST161	R911306476	
MST201	R911245301	
MST210A/ -C/ -D/ -E	R911306477	
MST210R	R911306478	
MST251	R996556274	
MST290	R911306479	
MST291C, -D, -E	R911306479	
MST291F	R913084405	
MST291Z	R913042601	
MST360	R911306480	
MST450	R911306482	
MST530	R911306481	
MST530M	R913079281	
MST531	R911306481	

Scope of delivery MRT rotor

The scope of delivery of a rotor contains:

- Rotor in its origin package
- Type plate (2 pcs.)
- 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 a. 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
UL / CSA	UL 1004, Fifth Edition
"registered component"	Canadian National Standard(s) C22.2 No. 100-04
UL-File	E 341734
Ambient temperature during operation	0 ... 40 °C
Motor design	Open (kit motor)
Type 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 be 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

4.2.1 Identification of motor components

Type code stator

Product

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

M S T = Stator of a MBT kit motor

Frame size

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

= see project planning manual

Frame lengths

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 cooling (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

Electrical connection

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

C N = Connection cable at stator side with bigger outer diameter

S N = Connection cable at stator side with smaller outer diameter

R N = Connection cable at radial stator side with bigger outer diameter

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

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

Other design

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

= see project planning manual

Fig. 1: Type code MST

Type plate stator MST

Two type plates with the exact type designation and technical data are enclosed for each stator. The UL-label of the stator is only visible at the type plate (main type plate).

Attach the type plate to an easily visible position at the machine. In 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.

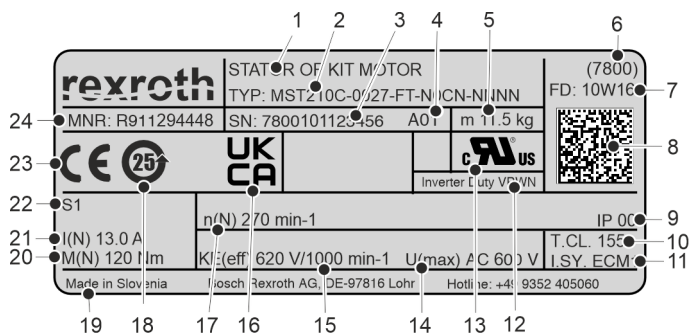


Fig. 2: Example type plate MST

- | | |
|-----------------------------------|---------------------------------------|
| 1 Type of machine | 13 UL label |
| 2 Type designation | 14 Maximum input voltage |
| 3 Serial number | 15 R.m.s. voltage constant |
| 4 Revision state | 16 UK Conformity Assessed (UKCA) |
| 5 Mass in kg | 17 Rated velocity in mode S1 |
| 6 Manufacturing plant | 18 China-RoHs 2 label |
| 7 Date of manufacture | 19 Designation of origin |
| 8 Rexroth barcode | 20 Rated torque in mode S1 |
| 9 Degree of protection by housing | 21 Rated current in operation mode S1 |
| 10 Thermal temperature class | 22 Operation mode S1 |
| 11 Insulation system | 23 CE mark of conformity |
| 12 Inverter Duty VPWM | 24 Material number |

Type code rotor

Product

M R T _ _ _ _ - _ _ - _ _ _ _ - _ _ _ _

M R T = Rotor of a MBT kit motor

Frame size

M R T _ _ _ _ - _ _ - _ _ _ _ - _ _ _ _

_ = see project planning manual

Frame length

M R T _ _ _ _ - _ _ - _ _ _ _ - _ _ _ _

_ = see project planning manual

Design / mechanical design

M R T _ _ _ _ - _ _ - _ _ _ _ - _ _ _ _

3 N = Fastening via screws

Inner diameter rotor

M R T _ _ _ _ - _ _ - _ _ _ _ - _ _ _ _

_ = see project planning manual

Other design

M R T _ _ _ _ - _ _ - _ _ _ _ - _ _ _ _

_ _ _ _ = see project planning manual

Fig. 3: Type code MRT

Type plate rotor MRT

Two type plates with the exact type designation and technical data are enclosed for each rotor. The UL-label is only visible on the type plate (main type plate).

Attach the type plate to an easily visible position at the machine. In 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.

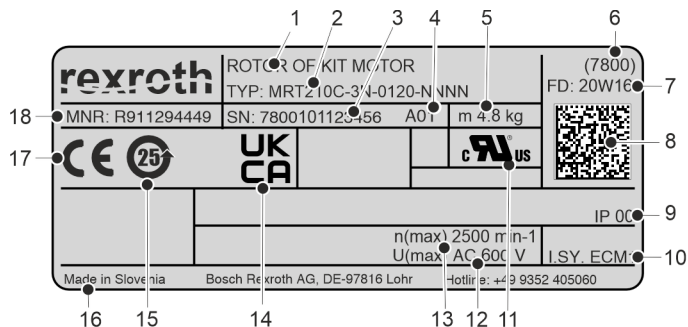


Fig. 4: Example of type plate MRT

- | | |
|-----------------------------------|--|
| 1 Type of machine | 10 Insulation system |
| 2 Type designation | 11 UL label |
| 3 Serial number | 12 Maximum input voltage |
| 4 Revision state | 13 Highest allowed velocity (mechanical) |
| 5 Mass in kg | 14 UK Conformity Assessed (UKCA) |
| 6 Manufacturing plant | 15 China-RoHS 2 label |
| 7 Date of manufacture | 16 Designation of origin |
| 8 Rexroth barcode | 17 CE mark of conformity |
| 9 Degree of protection by housing | 18 Material number |

4.2.2 Certification mark

Table 5: Mark of conformity at type plate

Certification mark	Meaning
CE	Conformity with applicable EC Directives
cULus	"registered component" according to UL + CSA
UKCA	UKCA approval
25	RoHS 2 conformity

5 Transport and storage

5.1 Transport instructions

Environmental conditions during transport

Transport our products only in their original package. Also refer to the specific ambient factors to protect the products from transport damage.

Based on EN IEC 60721-3-2:2018, 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.

Table 6: Allowed classes of environmental conditions during transport according to EN IEC 60721-3-2:2018

Classification type	Class
climatic environmental conditions	2K11
environmental conditions	2B1
chemically active substances	2C1
mechanically active substances	2S5
climatic environmental conditions	2M4

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

Table 7: Permissible ambient conditions deviating from EN IEC 60721-3-2:2018

Environmental factor	Unit	Value ¹⁾
Temperature	°C	-25 ... +70
Relative air humidity	%	5 ... 75
Absolute air humidity	g/m³	1 ... 29
Occurrence of salt mist	-	Not permitted

1) Deviating from EN IEC 60721-3-2:2018



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

Lifting eyebolts

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

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



Please comply with DIN 580 on the transport of motors using the attached 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 Rexroth housing

Stators which have already been ordered with housing ex factory feature one or two lifting eye bolts on the upper face of the housing (see dimension sheet of the stator), depending on the stator length or size, for transport. These lifting eye bolts also have to be used to lift and position the stators during assembly.

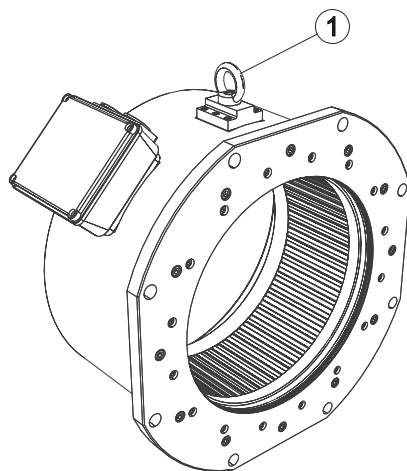


Fig. 5: Lifting eyebolt on MST450E with housing

- ① Lifting eyebolt for transport

Transporting stators with and without mounting ring

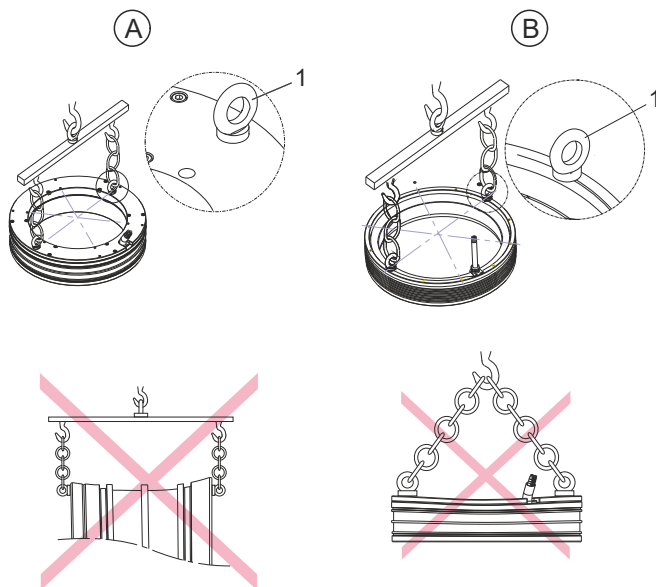


Fig. 6: Transport of the MST stators

- Ⓐ Handling with mounting ring
- Ⓑ Handling without mounting ring
- ① Lifting eyebolt for transport

Please note:

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

Instructions on transport by air

If motor components with permanent magnets are shipped by air, the DGR (**D**angerous **G**oods **R**egulations) of the IATA (International Air Transport Association) for hazardous materials of class 9 which also include magnetized substances and objects has to be complied with. This involves, for example:

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

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

5.2 Storage instructions

Store the motor only horizontally according to the following figure.

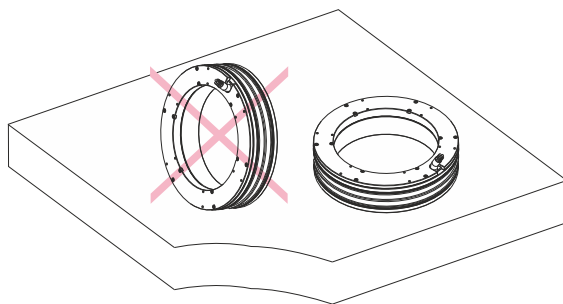


Fig. 7: Storing of motor components

Please note:

- Put down the motor only on a clean, straight surface in a horizontal position.
- Before storing or shipping the parts, remove the residual coolant and other contaminants.
- Use the transport crate to store the motor over a longer time and to protect it against damage and contamination.

Environmental conditions during storage

NOTICE

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

- Observe the permitted environmental conditions for storage.
- Covers fitted to the motor at the factory must remain on the motor during transport and storage.

Generally, Bosch Rexroth recommends storing all components until they are actually installed in the machine as follows:

- at a dry and dustfree location
- at room temperature
- free from vibrations and oscillations
- protected against light or direct sunlight

Based on EN IEC 60721-3-1:2018, 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.

Table 8: Allowed classes of environmental conditions during storage according to EN IEC 60721-3-1:2018

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

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

Table 9: Permissible ambient conditions deviating from EN IEC 60721-3-1:2018

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

1) Deviating from EN IEC 60721-3-1:2018

NOTICE	Damage due to moisture and humidity!
	– Protect the products from dampness and corrosion. – Store them only in rainproof and dry rooms. – Before storage, discharge the liquid coolant from liquid-cooled motors to avoid damage.

Storage times

The maximum storage duration is 2 years.

Storage durations of more than 6 months require conservation measures by the customer. Untreated metallic surfaces (e.g. shaft or flange) must be treated with a preserving agent to protect against corrosion.

Additional measures have to taken upon commissioning to ensure smooth functioning – irrespective of the storage time which may be longer than the warranty period of our products. However, this does not entail any additional warranty claims.

Table 10: Measures to be taken before commissioning motors or motor components in long-term storage

Storage time / months				Measures prior to commissioning
> 1	> 6	> 12	> 24	
●	●	●	●	Visual inspection of all parts to be damage-free
●	●	●	●	Resurface the holding brake ¹

Storage time / months				Measures prior to commissioning
> 1	> 6	> 12	> 24	
	●	●	●	Check conservation measures. Renew corrosion protection if necessary. Remove the preserving agent before commissioning
		●	●	Check the electric contacts to verify that they are free from corrosion
		●	●	Let the motor run in without load for one hour at ~20% of the specified nominal speed ²⁾
		●	●	Measure insulation resistance. Dry the winding at a value of < 1kOhm per volt rated voltage.
			●	Function test and product revision if necessary by Bosch Rexroth Service
1) Only motors with holding brake are affected				
2) Only motors with roller bearings are affected				

6 Assembly

6.1 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 ➔ www.loctite.de. The manufacturer's homepage also provides information on hardening accelerators or other screw locks.

6.2 Mechanical assembly

6.2.1 Basic precondition

Thorough execution of the described work steps ensures:

- correct and safe mounting and dismounting of the components,
- correct function of the motor.



If there are bearings to the left and to the right of the motor, e.g. also encoders, all bearings have to be insulated on one side, e.g. insulation of the stator.

Safety instructions

Strictly observe the listed safety instructions in the following mounting procedure ➔ [Chapter 2 "Safety instructions" on page 20](#) . They support the prevention of accidents and damage at material due to incorrect handling.

⚠ WARNING

Injuries caused by live parts! Lifting of heavy loads! Risk of damage!

- Carry out all work steps with particular care. This minimizes the risk of accidents and damage.
- Use suitable lifting equipment and protective equipment and wear protective clothing during transport.
- Do not lift or move the motor at the cable strand.
- Install the motors only when they are de-energized and not connected electrically.

The volume and order of the steps described can be affected by special features of the machine construction and deviate from the schematic procedure. The following description only serves for orientation. The machine manufacturer's mounting instructions are the only binding guidelines.

General information

Take the strong magnetic field around the rotor into account. Do not unpack the rotors from the original packaging before they are required for assembly.

Keep the rotor away from ferromagnetic bodies (e.g. tools, workbench made from metal, ...)

Workwear

Wear appropriate protective workwear when mounting such as

- Safety glasses
- Safety gloves

Work space, handling and transport

Please note the handling and transport regulations within ➔ [MBT Project planning manual](#). Label your work area generously with the instructions given there.

Accident prevention

The accident prevention "Electrical plant and apparatus" (VBG 4) has to be complied with:

Prior to working on shock-hazardous parts of electrical systems, ensure that these parts are de-energized and remain de-energized during the duration of the work. The electrical systems and equipment have to be checked before initial startup by an electrician to ensure that they are in proper condition.

The user is responsible for proper grounding of the complete system. To prevent accidents due to touching of live parts, protective measures against direct and indirect touch are necessary. For notes, refer to DIN VDE 0100, Part 410.

Emergency tools

For removal of magnetically attached objects, provide emergency tools such as wedges (angle 10°-15°) and a hammer made of non-magnetic material.

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 ➔ www.loctite.de. The manufacturer's homepage also provides information on hardening accelerators or other screw locks.

6.2.2 Installation

General

⚠ WARNING

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

- Remove or secure any movable metal objects.
- Carefully handle all magnetic components.
- Wear protecting clothes and use installation aids

The following mounting instructions describe a noncommittal, schematic construction without considering the special structural features of the machine and serve only for general orientation.

The machine manufacturer has to consider the special character of his construction and has to prepare special mounting instructions. The machine manufacturer's mounting instructions are the only binding guidelines.



- The rotor has to be mounted at room temperature and as described below. The rotor must not be heated!
- All screw connections are to be equipped with a liquid screw lock. See also ➔ Chapter 6.1 “Screw lock” on page 39.

Installation of stators with encapsulation “T”

Prior to stator installation, ensure that the coolant pipes of the cooling system and the cooling ducts of the stator function are correctly connected, the cooling ducts and the necessary separator are available (see Fig. 8)).

⚠ CAUTION

Damage of stator due to insufficient cooling!

If stator that is already in use or a previously disassembled stator is assembled again, check if the separator between inlet and outlet of the coolant is available (see fig.). 8). If the stator has been commissioned without a separator, insufficient cooling can result in damaging the stator.

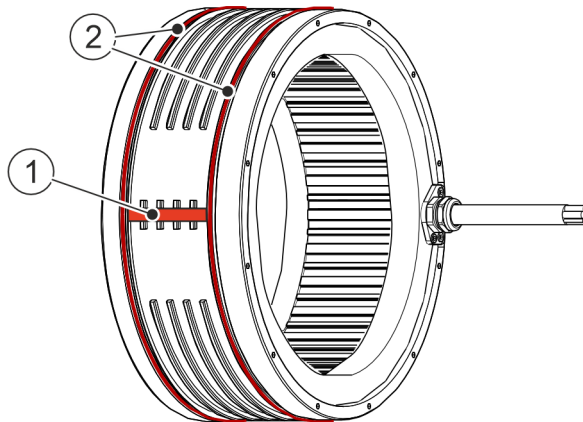


Fig. 8: Glued in separator taking the example of MST360

- ① Separator
- ② O-rings

NOTICE

Damage of stator due to penetrating cooling water (protection mode IP00)!

Water, liquids or humidity can lead to a damage and thus to failure of the stator. During installation, make absolutely sure that the O-rings used are in perfect condition, see Fig. 8.

It is not recommended to use O-rings more often.

Preparation

Initial state: The motor lies on a clean and a flat surface.

- Check whether the components are damaged. Damaged components must not be mounted.
- 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.
- 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.
- Prior to assembly, clean the contact surfaces of the stators design "...-NS-.." with a suitable cleaning agent (e.g., RIVOLTA A.C.S.3).
- 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.
- Screw the lifting eye bolts which are required for transport in mutually opposite threads. Check the machine construction to find out whether longer eye bolts with distance sleeves are required.

NOTICE**Ensure cleanliness during all working steps!**

When inserting the rotor into the stator, take the radial and axial forces caused by magnetic force into account ➔ Table 15 “Magnetic attractive forces during mounting” on page 60.

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.

6.2.3 Mounting stators with cooling jacket, without mounting ring

The following figures show the general mounting sequence. Comply with the machine manufacturer's special mounting instructions. All of the screwed connections mentioned below have to be secured with liquid screwlock. Refer to ➔ Chapter 6.1.

For details about existing threaded holes, tightening torques and screw-in depths, please refer to the particular rotor or stator dimension sheet

Initial state: The stator and rotor lie on a clean and flat surface. All of the steps described above have been complied with and have been executed.

Mount the motor according to the following schematic procedure:

1. ➔ Fasten the stator flange ② with the fastening screws ⑤ to the stator ③.

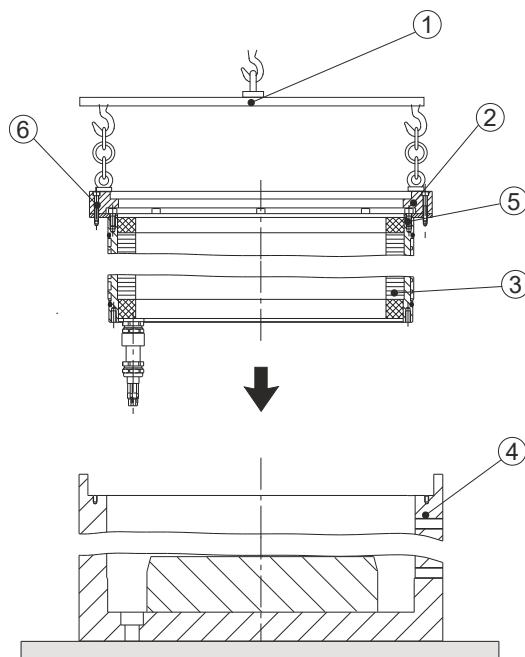


Fig. 9: Stator installation

- ① Lifting gear
- ② Stator flange
- ③ Stator
- ④ Machine housing
- ⑤ Mounting screws for stator flange
- ⑥ Mounting screws for stator flange - machine housing

2. ➔ Center the stator with a suitable tool ① in the machine housing ④ and bring it into its final position without jam.
3. ➔ Fasten the stator flange to the machine housing using the mounting screws ⑥.
4. ➔ Fasten the rotor flange ⑦ with the mounting screws ⑨ to the rotor ⑩.
5. ➔ Fasten the motor bearing ⑧ to the rotor flange.

6. → Secure the machine housing including the installed stator against lift-off from the work table.

▲ 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.

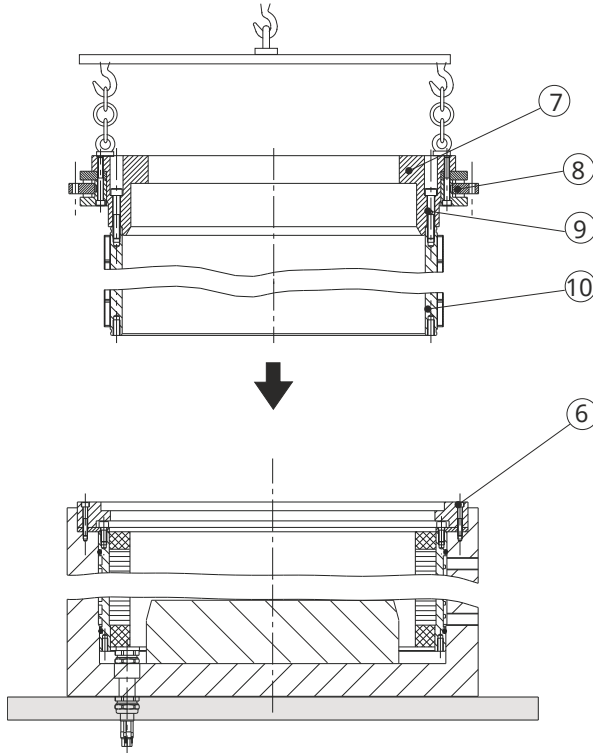


Fig. 10: Rotor installation

- ⑥ Mounting screws for stator flange - machine housing
- ⑦ Rotor flange
- ⑧ Axial radial bearing
- ⑨ Rotor mounting screws
- ⑩ Rotor

7. → Insert the rotor package centered (make forced guidance) into the stator until it reaches its final position.

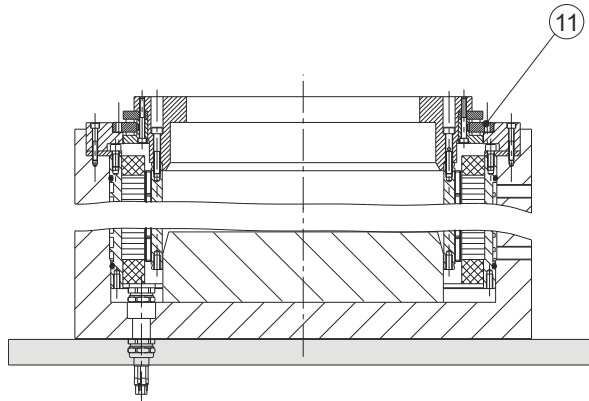


Fig. 11: MBT installation

⑪ Bearing mounting screws

8. ➔ Fasten the bearing ring with the fastening screws ⑪ to the stator flange.
9. ➔ Check the accuracy and stability of all mounted parts and mechanical connections.
Detach the machine housing from the working surface.

After proper mechanical assembly, continue with the other connections.

6.2.4 Mounting stators with cooling jacket and mounting ring (option)



- To facilitate assembly, Bosch Rexroth provides a mounting ring for frame sizes 450 and 530. For more information on the mounting ring, please refer to ➔ [MBT Project planning manual](#).
- All screw connections are to be equipped with a liquid screw lock. See also ➔ [Chapter 6.1 "Screw lock"](#) on page 39.

The following figures show the general mounting sequence. Comply with the machine manufacturer's special mounting instructions. For details about existing threaded holes, tightening torques and screw-in depths, please refer to the particular rotor or stator dimension sheet.

Mount the motor according to the following schematic procedure:

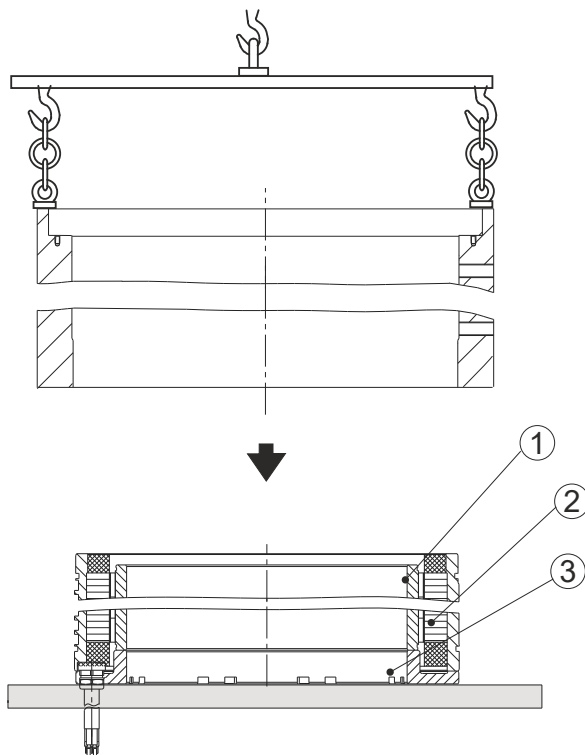


Fig. 12: Mounting the stator-rotor package

- ① Rotor
- ② Stator
- ③ Mounting ring

1. ➔ Lower the prepared machine housing down to its final position while it is centered over the stator-rotor package. While doing so, ensure that the stator centering device appropriately guides the housing and that the housing does not get jammed.

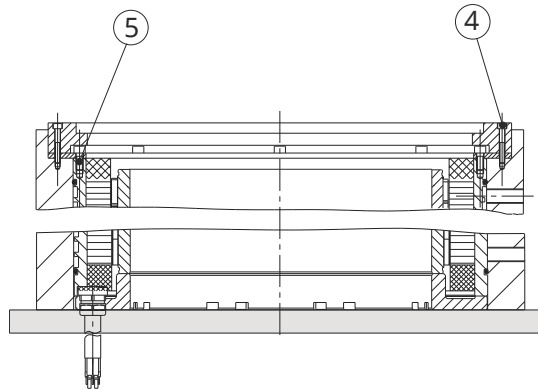


Fig. 13: Mounting the stator flange

④ Mounting screws for stator flange - machine housing

⑤ Mounting screws for stator flange - stator

2. ➔ Fasten the stator flange to the stator and also to the machine housing using the mounting screws ④ and ⑤.

3. ➔ Screw in the motor bearing ring (bearing ring) and rotor flange using the mounting screws ⑧.

4. ➔ Lower the rotor flange including mounted bearing into the rotor until the centering device ⑨ on the rotor flange engages the rotor hole.

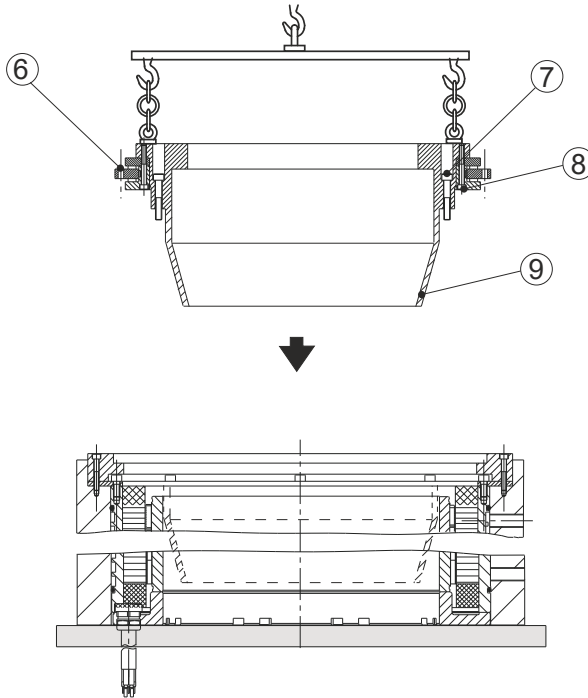


Fig. 14: Mounting the rotor flange with bearing

- ⑥ Bearing ring mounting holes
- ⑦ Rotor flange mounting screws
- ⑧ Rotor bearing ring mounting screws
- ⑨ Centering collar

- 5.** → Loosen the mounting screws of the mounting ring on the stator (**not on the rotor**). Do not unscrew them completely yet.
- 6.** → Lower the rotor flange with mounted bearing down to its end position while centering it over the rotor.
Screw the rotor flange and the rotor using the mounting screws ⑦.
- 7.** → Screw the bearing ring and stator flange using the mounting screws ⑥.

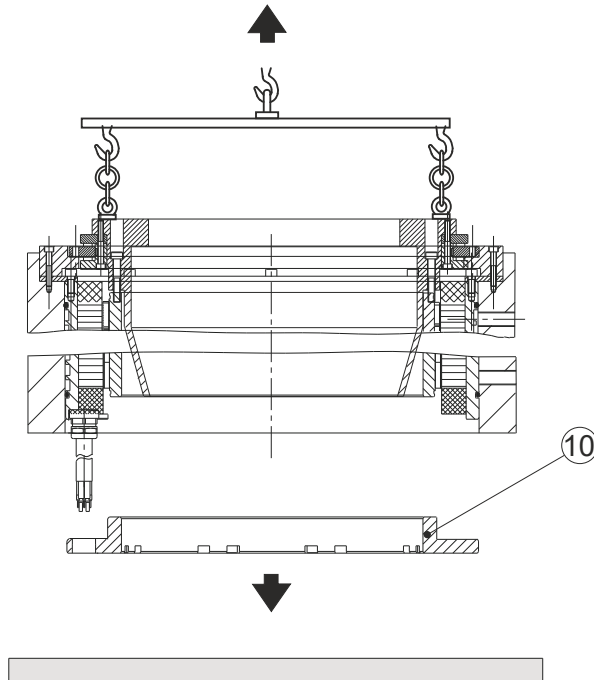


Fig. 15: Disassembling the mounting ring

⑩ Mounting ring

8. ➤ Loosen and remove all mounting screws from the mounting ring ⑩ and remove it.

9. ➤ Check the accuracy and stability of all mounted parts and mechanical connections.

After proper mechanical assembly, continue with the other connections.

6.2.5 Mounting stators with cooling jacket and housing

General

Depending on the intended use of the motor, certain stators can be ordered which are already installed in a stator housing (type code option "H"). This has the advantage that the supplied stator is ready to be mounted to the machine.

For details about type, quality and position of the mounting holes, please refer to the relevant dimension sheet.



- In general, the stator housing has to be connected to the machine via all of the mounting holes in the motor flange.
- All screw connections are to be equipped with a liquid screw lock. See also ➔ Chapter 6.1 "Screw lock" on page 39.

The following mounting instructions serve only for general orientation purposes and use an example MST530 to describe a noncommittal, schematic construction without considering the special structural features of the machine.

The machine manufacturer has to consider the special character of his construction and has to prepare special mounting instructions. The machine manufacturer's mounting instructions are the only binding guidelines.

The installation dimension sheets in [➔ MBT Project planning manual](#) provide additional instructions and recommendations about general motor assembly. For this reason, the figures 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. Including:

- Motor encoder
- Spacer sleeve (for rotor assembly)
- Clamping ring and clamping plate (for rotor assembly)

We recommend to follow the steps described below for motor assembly:

- Mount the stator to the machine.
- Connect rotor and spacer sleeve to the clamping plate.
- Position the rotor with spacer sleeve on the shaft and fasten it with a clamping ring.
- Attach the motor encoder.
- Mount the housing lid and the encoder cover.
- Make the electrical connection and the coolant connection.

Dimensioning the shaft end

Maybe the rotor is not coaxially installed in the stator, due to installation tolerances of the system. During operation, radial forces may therefore act in the motor and, thus, also on the shaft end to which the rotor is mounted.

To ensure sufficient stiffness of the drive system, the following factors must be taken into account during dimensioning of the required shaft diameter:

- Required minimum air gap after assembly of rotor and stator
- Radial forces acting during operation due to the permanent magnets on the rotor (see the table below)
- Weight of the rotor and where applicable further radial forces acting depending on the particular application

the following dependencies are taken into consideration:

Therefore, the shaft diameter (see Table) have to be dimensioned taking the bending of the shaft into account, the air gap S_2 (see [➔ Tab. 11](#)) never falls below the minimum value after installation between rotor and stator.

Table 11: Radially acting magnetic forces during operation

MRT...	Air gap s_2 min [mm] (rotor and stator mounted)	Radial force $F_{\text{radial, operation}}$ [N]
110A	0.25	60

MRT...	Air gap s_2 min [mm] (rotor and stator mounted)	Radial force
		$F_{\text{radial, operation}}$ [N]
130A	0.30	70
130C		210
130E		340
130G		470
160A		210
160C		410
160E		620
161C		190
161E		380
161G		570
161M		270
201C		280
201D		410
201F		615
210A		170
210C		420
210D		580
210E		830
210U		1870
251 F		1,380
290B		500
290D		750
290E		1,250
290 F		1,500
290G		1,750
291C		530
291D		800
291E		1,060
360B		540
360D		800
360E		1,330
450B	0.35	770
450D		1,150
450E		1910
530B		910
530C		1,360
530D		1820
530E		2,270
530F		2730
530G		4,560

MRT...	Air gap s_2 min [mm] (rotor and stator mounted)	Radial force $F_{\text{radial, operation}}$ [N]
530L		6,840
530P		3,180
530R		4090
531E		1960
531L		5,860



Dimension the shaft diameter which is to receive the spacer sleeve for the rotor so that bending is limited.

Also refer to the data on the radial forces which can occur during assembly (see ➔ Chapter “Preparation” on page 42table).

Mounting the stator

Stators which have already been ordered with a housing according to the motor type code can be mounted to the machine directly via the mounting holes in the flange.

When configuring the screwed connection, observe the data in the dimension sheet referring to the quantity and size of the flange mounting holes.



- In general, the stator has to be connected to the machine via all mounting holes.
- All screw connections are to be equipped with a liquid screw lock. Refer to ➔ Chapter 6.1 “Screw lock” on page 39.
- 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.

Mounting the stator

1. ➔ Ensure cleanliness during all working steps!

Refer to the instruction on how to prepare mounting in ➔ Chapter “Safety instructions ” on page 39.

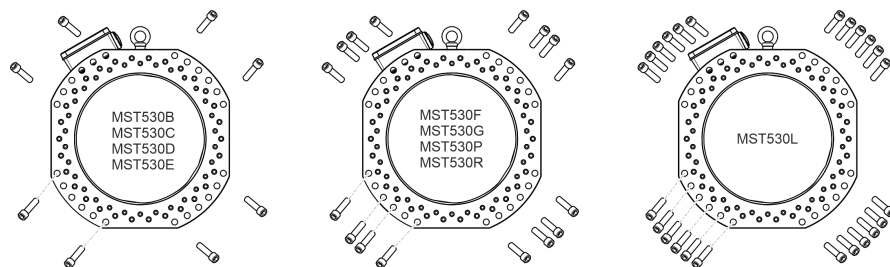


Fig. 16: MST530 Housing fastening

- 2.** → Lift and position the stator on the machine via suitable lifting tools and the lifting eye bolt on the stator housing.

⚠ Avoid...

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

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 → table 12).

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

Table 12: Mounting screws with tightening torque

Screws (property class 8.8)	M _{GA} [Nm] at μ _G 0.12
M16 x ...	206
M20 x ...	415

M_{GA} - Tightening torque in Newton meters

μ_G - Friction coefficient

Mounting the rotor

The rotor assembly procedure described below is intended to present a possible proposal for rotor assembly. 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.

Essentially, the rotor is guided on a spacer sleeve over two insertion fittings in the rotor hole and fastened with a clamping plate. Subsequently, it has to be inserted into the stator centered over the shaft to be driven and fastened with a clamping ring.

▲ WARNING

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

- Remove or secure any movable metal objects.
- Carefully handle all magnetic components.
- Wear protecting clothes and use installation aids

Comply with the details in the particular dimension sheet during assembly, such as

- the quantity and type of the mounting holes,
- min. screw-in depth and screw-dependent tightening torques.



- The screw length required depends on the machine construction.
- The screw connections have to be able to take up both the force due to the weight of the motor and the forces acting during operation.
- All screw connections are to be equipped with a liquid screw lock. Refer to ➞ Chapter 6.1 “Screw lock” on page 39.

Mounting the rotor

Ensure cleanliness during all working steps!

1. ➞ Connect the rotor and the spacer sleeve to a clamping plate. After fastening, it has to be ensured that both centering diameters of the rotor hole (also refer to installation examples in ➞ MBT Project planning manual) are guided on the spacer sleeve.

Connect the rotor by means of a mounting tool for inserting the rotor into the stator (for example see ➞ MBT Project planning manual).

2. ➞ Using the mounting tool, push the rotor over the shaft end to its end position. We recommend to provide a friction bearing (bronze bushing, etc.) on one side of the shaft end, which allows axial length compensation due to the slightly increased heating of the rotor as compared with the shaft during motor operation.

▲ WARNING

Strong magnetic forces may cause injury/damage! The permanent magnets on the rotor and the resulting magnetic forces cause the rotor ...

⇒ is promptly pulled into the stator (axial force). use appropriate mounting tools to prevent uncontrolled movements of the rotor during assembly

⇒ is attracted by the stator hole (radial force). Refer to the details about occurring radial forces in ➞ Chapter “Preparation” on page 42.

3. ➞ Clamp the spacer sleeve onto the shaft end using a clamping ring. The clamping ring causes safe power transmission of the motor to the shaft to be driven.

6.2.6 Mounting motor encoder and covers

After the stator has been fastened to the machine and the rotor to the shaft, the encoder can be connected.



- The motor encoder is not included in the scope of delivery of the motor and must be provided by the user.

Essentially, the following steps have to be carried out:

- Mount the motor encoder to the shaft.
- Close the motor housing and the encoder installation space with the provided covers.
- Do the electric connection and the coolant connection according to ➔ [MBT Project planning manual](#).

6.2.7 Parallel arrangement: Two motors on one shaft in connection with a controller and an encoder

In a parallel arrangement, the motors are arranged on a shaft to be driven one after the other.

The advantage of this mounting type is that it doubles the output motor torque, provided the motors are properly arranged and correctly activated.



The following examples start from the assumption that a radial cable outlet is used on the stators. Because of bending radii that have to be retained, an axial cable outlet or connection cable with stranded wires might require longer distances between two motors. Please observe the notes within chapter "Connection techniques" of the ➔ [MBT Project planning manual](#).

Parallel arrangement - rotor assembly

At a point on their front face, all rotor sleeves are marked with an "S" (south pole) for the row of magnets above them. This mark is at the same position on all of the rotors.



If the rotor mark on the front face is covered after installation, mark the point where the "S" is positioned on the rotor on your machine for further assembly.

Both rotors have to be positioned on the shaft such that the "S" mark on the rotors is always positioned on the same side (left or right) and at the same point in the circumference.

This ensures that the hole pattern (front-face hole circle diameter with threaded holes) as well as the polarity of the magnets are aligned. This is the only position in which the resulting motor torque can be transmitted optimally.

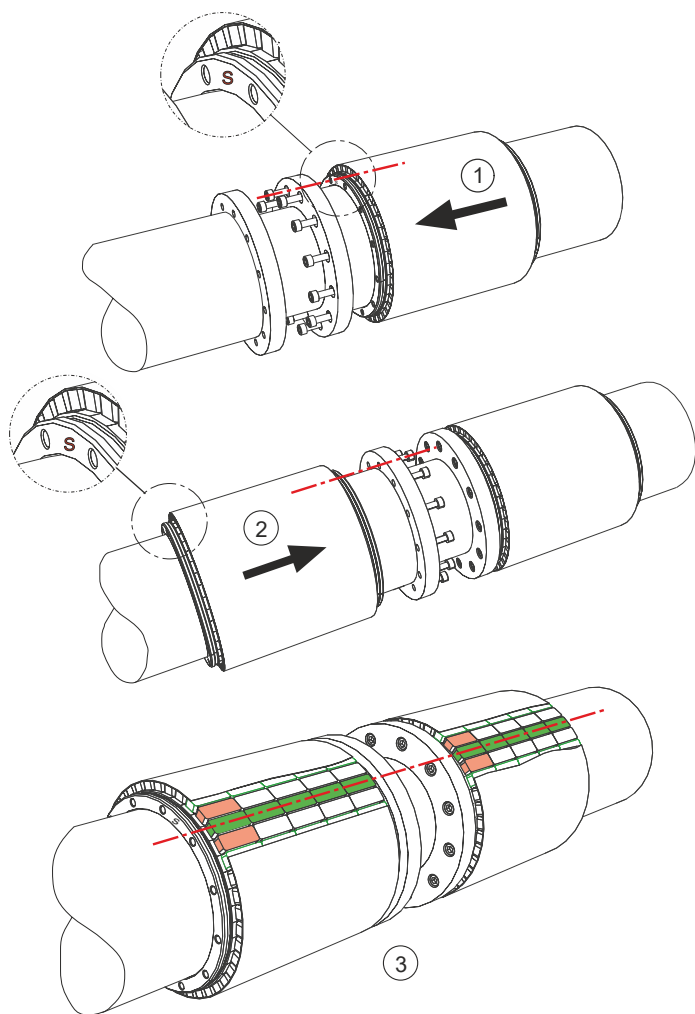


Fig. 17: Mounting the rotor with parallel motor arrangement

- ① Mount the first rotor (transfer "S" mark to machine)
- ② Mount the second rotor (align "S" mark according to "S" position of first rotor)
- ③ Correct assembly = aligned pole rows of the magnets

Parallel arrangement -stator assembly

During stator assembly, both stators have to be aligned in the axis construction (as the two rotors), For stators with radial cable output that should be used for parallel alignment, the cable output position is the mark for the alignment (see [fig.](#) and [fig.](#)..

Parallel arrangement - power cable connection (cable outlet in the same direction)

If the stator is mounted with cable outlet in the same direction, the connection wires of the stators must be applied according to the instructions in chapter "Connection technology" or in [fig.](#).

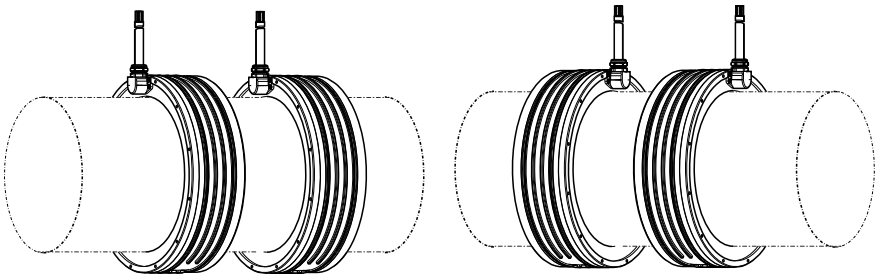


Fig. 18: Parallel motor arrangement (cable outlet in the same direction)

Table 13: Connecting the power wires in case of parallel arrangement of stators with equal cable outlet direction on a drive controller

Connection in case of arrangement with cable outlet in the same direction			
Drive controller	A1	A2	A3
(slot designation at X5)			
Stator 1	1 (U)	2 (V)	3 (W)
Stator 2	1 (U)	2 (V)	3 (W)

Parallel arrangement - power cable connection (cable outlet in opposite directions)

If the stator is mounted with cable outlet in opposite directions, two phases must be rotated and applied according to [fig.](#)..

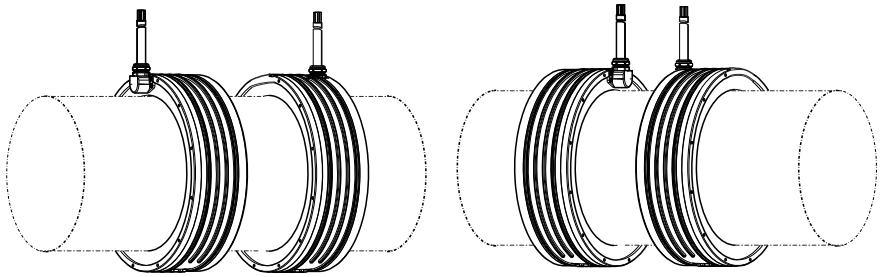


Fig. 19: Parallel motor arrangement (cable outlet in opposite directions)

Table 14: Connection of the power wires in case of parallel arrangement of primary parts on a drive controller

Connection in case of stator arrangement with cable outlet
in opposite directions

Drive controller (slot designation at X5)	A1	A2	A3
Stator 1	1 (U)	2 (V)	3 (W)
Stator 2	1 (U)	3 (W)	2 (V)

6.2.8 Rotor assembly and fastening



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 in chapter ➡ Chapter 2.5.3 "Protection against magnetic and electromagnetic fields" on page 24.

Attractive forces during mounting

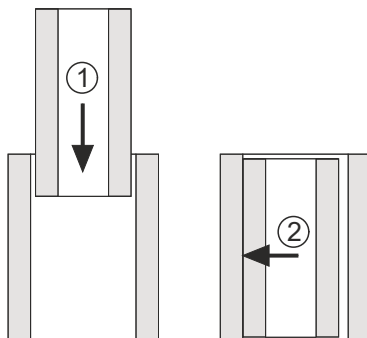


Fig. 20: Attractive forces among rotor and stator

- ① F_{axial}
- ② F_{radial}

Table 15: Magnetic attractive forces during mounting

Frame size ...		F_{axial} [N]	F_{radial} [N]
110	A	90	100
	A		120
130	C	105	370
	E		610
	G		850
	A		410
160	C	145	820
	E		1,230
	C		535
161	E	145	1,070
	G		1,105
	M		910
	C		690
201	D	185	1,040
	F		1,740
	A		330
210	C	195	830
	D		1,160
	E		1,650
	U		3,630
251	F	250	2,460
290	B	290	1,000
	D		1,500

Frame size ...		F _{axial} [N]	F _{radial} [N]
291	E	290	2490
	F		3000
	G		3500
	C		1,250
	D		1870
360	E	370	2490
	B		1,280
	D		1910
450	E	480	3,190
	B		1,660
	D		2,480
	E		4,130
530	B	565	1940
	C		2920
	D		3,890
	E		4,860
	F		5,830
	G		9,710
	L		14,560
531	P	565	6,800
	R		8,750
	E		4,590
	L		13,770

Assembly

Fastening thread at the rotor

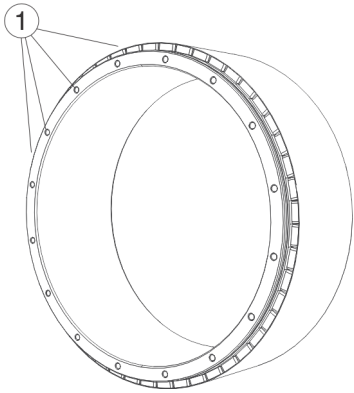


Fig. 21: Fastening thread at the rotor

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

Table 16: 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
MRT251	M6 / 14 mm deep	30
MRT290B		12
MRT290D		12
MRT290E	M6 / 14 mm deep	20
MRT290F		30
MRT290G		30
MRT291C		12
MRT291D	M6 / 14 mm deep	12
MRT291E	M6 / 14 mm deep	20
MRT360B		16
MRT360D	M6 / 14 mm deep	16
MRT360E	M8 / 18 mm deep	16
MRT450B		12
MRT450D	M8 / 18 mm deep	12
MRT450E	M8 / 18 mm deep	20
MRT530B		12
MRT530C	M8 / 18 mm deep	12
MRT530D		20
MRT530E	M8 / 18 mm deep	20
MRT530F		20
MRT530G		40
MRT530L		20
MRT530P	M10 / 20 mm deep	20
MRT530R		30
MRT531E	M8 / 18 mm deep	20
MRT531L	M10 / 20 mm deep	40



- The necessary screw length to fasten the rotor, depends on the machine construction.
- All screw connections are to be equipped with a liquid screw lock. See also ➔ Chapter 6.1 “Screw lock” on page 39.
- The screw 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.

6.2.9 Coolant connection

Establish the connection of the coolant supply for the motor according to ➔ Chapter 6.4 “Coolant connection” on page 81 and the machine manufacturer's connection diagrams.

Prior to machine commissioning, the whole cooling system must be subjected to a leakage test and be ventilated. Also comply with the manufacturer's instructions.



- 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. The drive components have to be connected in the machine exclusively according to the machine manufacturer's system circuit diagrams. This also applies to the incorporation of systems for pressure reduction, flow and temperature monitoring.
- 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.

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 may be operated only with suitable drive controllers with variable output voltage and frequency (converter mode) as specified by Rexroth.

6.3.2 Power connection

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.

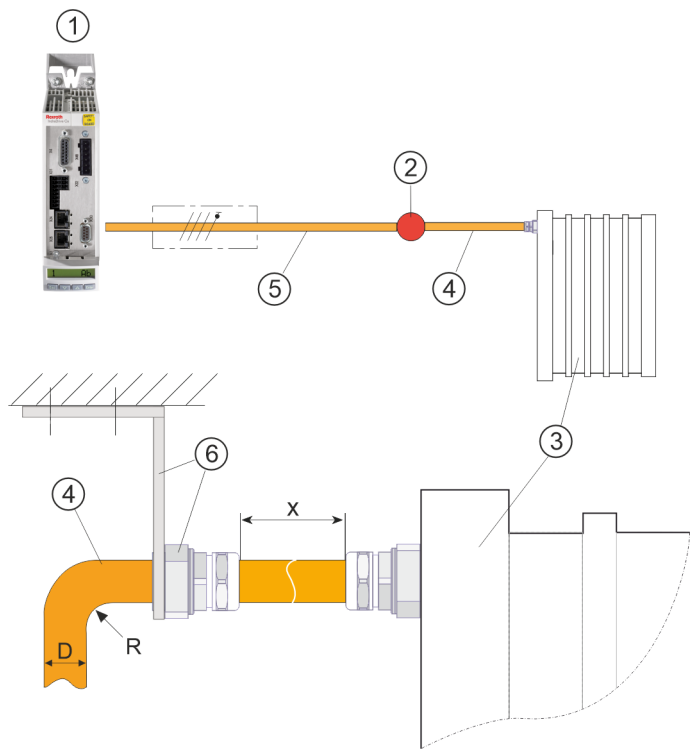


Fig. 22: Cable gland with strain relief

- ① Drive controller
- ② Junction
- ③ MST Stator
- ④ Connection cables
- ⑤ Power cable
- ⑥ Strain relief of cable gland at stator
- x Minimum distance 10 mm
- D Diameter of connection cable
- R Bending radius

Table 17: Bending radius R

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

* for fixed installation

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. 19 .

Table 18: Cross section sensor wires at stator design "D30_"

Temperature sensor	Cross section power wires
SNM.150.DK	0.5 mm²

Temperature sensor	Cross section power wires
KTY84-130	AWG24

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

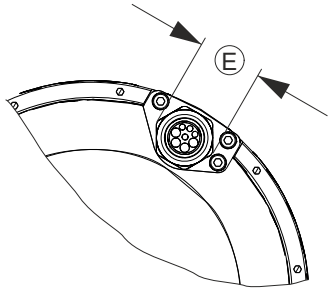


Fig. 23: Cable gland at the stator

Ⓔ Dimension "E", screw connection size see → Tab. 19

Connection cables at the stator

Table 19: Connection cables at the stator

MST Stator	Connection mode ¹⁾	Cross section [mm ²]		Ø D [mm] ²⁾	Dimension "E" [mm] ³⁾	Minimum cross section Continuitive power cable [mm ²]
		Power	Sensors			
130A-0200-F... -D303	Wires					1.0
130A-0250-N... -D303	Wires					1.0
130C-0050-F... -D303	Wires					1.0
130C-0075-N... -D303	Wires					1.0
130C-0200-F... -D303	Wires	AWG ⁴⁾ 16	see Tab. 24	2.85 ±0.2	/	1.5
130C-0300-N... -D303	Wires					1.0
130E-0020-F... -D303	Wires					1.0
130E-0035-N... -D303	Wires					1.0
130G-0035-N... -D303	v					1.0
130A-0200-F... -NNNN	INK0678	1.5	-/-	9.8 ±0.3	23	1.0
130C-0050-F... -NNNN	+				23	1.5
130C-0200-F... -NNNN	5xTTZ18-	-/-	1.0	6.0 ±0.2	23	1.5
130E-0020-F... -NNNN	1930Z11Y				23	1.0

MST 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			
160A-0050-F...-NNNN	REL0107 (INK0602)	2.5	1.0	14.8 ±1	32	1.0
160C-0050-F...-NNNN		2.5	1.0	14.8 ±1	32	1.0
160E-0027-F...-NNNN		2.5	1.0	14.8 ±1	32	2.5
160E-0050-F...-NNNN		2.5	1.0	14.8 ±1	32	2.5
160A-0050-F...-D303	Wires	AWG 14	see Tab. 24	3.5 ±0.2	/	1.0
160C-0050-F...-D303	Wires	AWG 14		3.5 ±0.2		1.0
160E-0027-F...-D303	Wires	AWG 14		3.5 ±0.2		2.5
160E-0050-F...-D303	Wires	AWG 14		3.5 ±0.2		2.5
161C-0140-F...-NNNN	REL0107	2.5	1.0	14.8 ±1	32	2.5
161E-0050-F...-NNNN	(INK0602)	2.5	1.0	14.8 ±1	32	2.5
161C-0140-F...-D303	Wires	AWG 14	see Tab. 24	3.5 ±0.2	/	2.5
161E-0050-F...-D303	Wires	AWG 12		4.0 ±0.2		2.5
161E-0140-F...-D303	Wires	AWG 10		4.7 ±0.2		6.0
161G-0100-F...-D303	Wires	AWG 10		4.7 ±0.2		6.0
201C-0010-F...-D303	Wires	AWG 16	see Tab. 24	2.85 ±0.2	/	1.0
201C-0027-F...-D303	Wires	AWG 16		2.85 ±0.2		1.5
201D-0010-F...-D303	Wires	AWG 16		2.85 ±0.2		1.0
201D-0027-F...-D303	Wires	AWG 16		2.85 ±0.2		1.0
201F-0075-F...-NNNN	REL0109 (INK0604)	6.0	2 x 1.0 2 x 1.5	18.5 ±1	33	6.0
210A-0027-F...-D30x	Wires	AWG 14	see Tab. 24	3.5 ±0.2	/	1.0
210D-0070-F...-D301	Wires	AWG 10		4.68 ±0.2		6.0
210U-0030-F...-D303	Wires	AWG 8		6.4 ±0.2		10.0
210A-0027-F...-NNNN	REL0107	2.5	1.0	14.8 ±1	34	1.0
210C-0027-F...-NNNN	(INK0602)	2.5	1.0	14.8 ±1	34	1.0
210C-0050-F...-NNNN	REL0108	4.0	2 x 1.0	17 ±0.5	33	4.0
210E-0027-F...-NNNN	(INK0603)	4.0		17 ±0.5	33	4.0
210D-0070-F...-NNNN	REL0109 (INK0604)	6.0	2 x 1.5	18.5 ±1	33	6.0
251F-0040-F...-D303	Wires	16.0	see Tab. 24	9 ±0.3	/	16.0
290B-0018-F...-NNNN	REL0107 (INK0602)	2.5	1.0	14.8 ±1	34	1.5
290D-0002-F...-NNNN		2.5	1.0	14.8 ±1	34	1.0
290D-0004-F...-NNNN		2.5	1.0	14.8 ±1	34	1.0
290D-0018-F...-NNNN	REL0108 (INK0603)	4.0	2 x 1.0 2 x 1.5	17.0 ±0.5	33	4.0

MST Stator	Connection mode ¹⁾	Cross section [mm ²]		Ø D [mm] ²⁾	Dimension "E" [mm] ³⁾	Minimum cross section
		Power	Sensors			Continuative power cable [mm ²]
290E-0004-F...-NNNN		4.0	2 x 1.0 2 x 1.5	17.0 ±0.5	33	1.0
290E-0018-F...-NNNN	REL0109 (INK0604)	6.0	2 x 1.0 2 x 1.5	18.5 ±1	33	6.0
290F-0020-F...-D303	Wires	AWG 8	see	6.4 ±0.2	/	10.0
290G-0020-F...-D303	Wires	AWG 8	Tab. 24	6.4 ±0.2		10.0
291C-0018-F...-D303	Wires	AWG 12	see	4.0 ±0.2	/	2.5
291D-0010-F...-D303	Wires	AWG 12	Tab. 24	4.0 ±0.2		2.5
291E-0010-F...-D303	Wires	AWG 12		4.0 ±0.2		2.5
360B-0006-F...-NNNN	REL0107 (INK0602)	2.5	1.0	14.8 ±1	34	1.0
360B-0018-F...-NNNN	REL0108 (INK0603)	4.0	2 x 1.0 2 x 1.5	17.0 ±0.5	33	2.5
360D-0009-F...-NNNN	REL0107 (INK0602)	2.5	1.0	14.8 ±1	34	1.0
360D-0012-F...-NNNN	REL0108 (INK0603)	4.0	2 x 1.0 2 x 1.5	17.0 ±0.5	33	2.5
360D-0018-F...-NNNN		4.0	2 x 1.0 2 x 1.5	17.0 ±0.5	33	4.0
360E-0008-F...-NNNN	REL0107 (INK0602)	2.5	1.0	14.8 ±1	39	2.5
360E-0018-F...-NNNN	REL0110 (INK0605)	10.0	1.0	22.2 ±1	40	10.0
360B-0006-F...-D303	Wires	AWG 14	see Tab. 24	4.0 ±0.2	/	1.0
360B-0018-F...-D303	Wires	AWG 12		4.0 ±0.2		2.5
360D-0009-F...-D303	Wires	AWG 14		4.0 ±0.2		1.0
360D-0012-F...-D303	Wires	AWG 12		4.0 ±0.2		2.5
360D-0018-F...-D303	Wires	AWG 10		4.7 ±0.2		4.0
360E-0008-F...-D303	Wires	AWG 14		4.0 ±0.2		2.5
360E-0018-F...-D303	Wires	AWG 8		6.4 ±0.2		10.0
450B-0012-F...-NNNN	REL0109 (INK0604)	6.0	2 x 1.0 2 x 1.5	18.5 ±1	33	2.5
450D-0006-F...-NNNN	REL0108 (INK0603)	4.0	2 x 1.0 2 x 1.5	17.0 ±0.5	33	2.5

MST Stator	Connection mode ¹⁾	Cross section [mm ²]		Ø D [mm] ²⁾	Dimension "E" [mm] ³⁾	Minimum cross section
		Power	Sensors			Continuative power cable [mm ²]
450D-0012-F... -NNNN	REL0109 (INK604)	6.0	2 x 1.0 2 x 1.5	18.5 ± 1	33	6.0
450E-0006-F... -NNNN		6.0	2 x 1.0 2 x 1.5	18.5 ± 1	33	6.0
450E-0011-N... -NNNN	(REL0107 (INK0602)	2.5	1.0	14.8 ± 1	34	1.0
450E-0012-F... -NNNN	REL0110 (INK0605)	10.0	1.0	22.2 ± 1	40	10.0
450E-0018-N... -NNNN	REL0108 (INK0603)	4.0	2 x 1.0 2 x 1.5	17.0 ± 0.5	33	2.5
450B-0012-F... -D303	Wires	AWG 12	see Tab. 24	4.0 ± 0.2	/	2.5
450D-0006-F... -D303	Wires	AWG 14		3.5 ± 0.2		2.5
450D-0012-F... -D303	Wires	AWG 10		4.7 ± 0.2		6.0
450E-0006-F... -D303	Wires	AWG 10		4.7 ± 0.2		6.0
450E-0012-F... -D303	Wires	AWG 8		6.4 ± 0.2		10.0
530B-0010-F... -NNNN	REL0109 (INK0604)	6.0	2 x 1.0 2 x 1.5	18.5 ± 1	33	4.0
530C-0010-F... -NNNN		6.0	2 x 1.0 2 x 1.5	18.5 ± 1	33	6.0
530C-0010-N... -NNNN		6.0	2 x 1.0 2 x 1.5	18.5 ± 1	33	6.0
530C-0014-F... -NNNN		6.0	2 x 1.0 2 x 1.5	18.5 ± 1	33	6.0
530D-0012-F... -NNNN	REL0110 (INK0605)	10.0	1.0	22.2 ± 1	40	10.0
530E-0010-F... -NNNN	REL0111	16.0	1.5	25.5 ± 1	44	16.0
530F-0012-F... -NNNN	(INK0606)	16.0	1.5	25.5 ± 1	44	16.0
530G-0006-F... -D303	Wires	2 x 16.0	see Tab. 24	2 x 9 ± 0.3	/	2 x 10.0
530G-0007-F... -D303	Wires	2 x 16.0		2 x 9 ± 0.3		2 x 16.0
530G-0010-F... -D303	Wires	2 x 16.0		2 x 9 ± 0.3		2 x 25.0
530L-0003-F... -D303	Wires	16.0		9 ± 0.3		10.0
530L-0006-F... -D303	Wires	2 x 16.0		2 x 9 ± 0.3		2 x 25.0
530L-0007-F... -D303	Wires	2 x 16.0		2 x 9 ± 0.3		2 x 25.0
530P-0012-F... -D303	Wires	25.0		9 ± 0.3		25.0
530R-0011-F... -D303	Wires	25.0		9 ± 0.3		35.0

MST Stator	Connection mode ¹⁾	Cross section [mm ²]		Ø D [mm] ²⁾	Dimension "E" [mm] ³⁾	Minimum cross section
		Power	Sensors			Continuative power cable [mm ²]
531E-0006-F...-D303	Wires	AWG 8	see Tab. 24	6.4 ±0.2	/	6.0
531E-0018-F...-D303	Wires	16.0		9 ±0.3		2 x 10.0
531L-0009-F...-D303	Wires	2 x 16.0		2 x 9 ±0.3		35.0

- 1) For the amount of stranded wires refer to Fig. 24.
 - 2) Sizing according to DIN VDE 0298-4. The required power wire cross-sections are applicable to laying type B2 (single installation). 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.
- The wire designation at the motors with connection cable depends on the selected stator design and has to be done as follows:

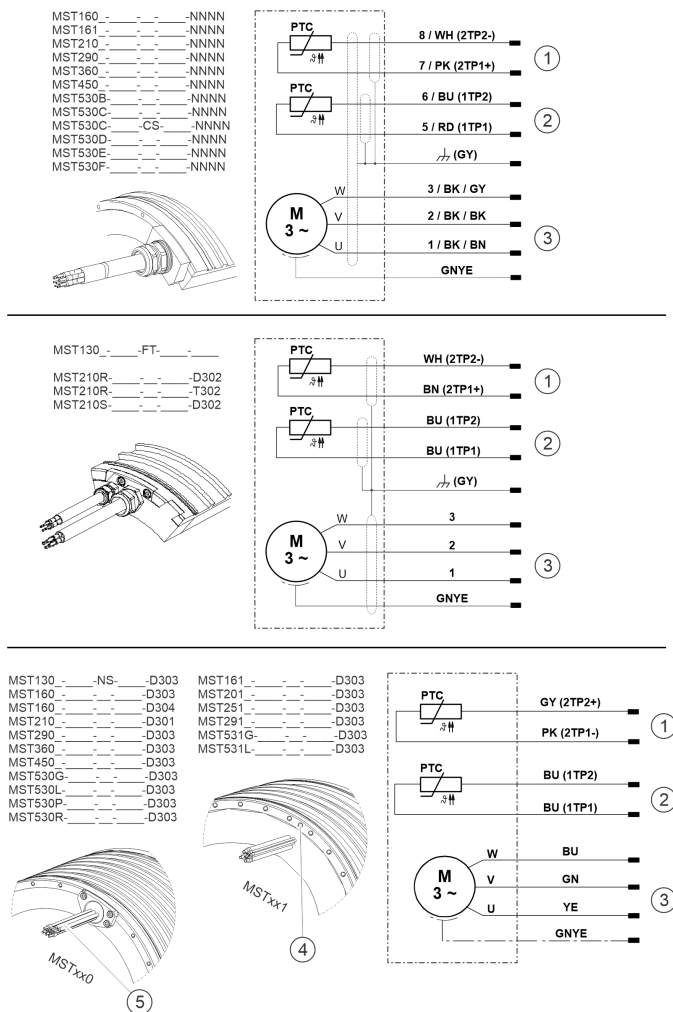


Fig. 24: Wire identification at stators with connection cable

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

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

Power connection of stators with housing

General

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. Ready-made power cables are available from Rexroth.

Stators with housing and device connector

Table 20: Device connector overview

Frame size	Device connector	Required power wire cross section [mm²]
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

Table 21: 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.

Stators with housing and terminal box

Table 22: Stators with housing and terminal box

Frame size MST	Designation	U-V-W	Terminal box Connection cross section [mm ²]	Ø PE	Connection thread	Minimum cross section Continuative power cable [mm ²]
360B-0006-FH-xxKR-...	RLK0003		2.5 10			
360B-0018-FH-xxKR-...	RLK0003		2.5 ... 10			
360D-0009-FH-xxKR-...	RLK0003		2.5 ... 10			
360D-0012-FH-xxKR-...	RLK0003		2.5 ... 10	RTE ²⁾ for thread M6	See motor dimension sheet	see → Tab.
360D-0018-FH-xxKR-...	RLK0003		2.5 ... 10			
360E-0008-FH-xxKR-...	RLK0003		2.5 ... 10			
360E-0018-FH-xxKR-...	RLK0003		2.5 ... 10			
450B-0012-FH-xxKR-...	RLK0004		2.5 ... 16			
450D-0006-FH-xxKR-...	RLK0004		2.5 ... 16			
450D-0012-FH-xxKR-...	RLK0004		2.5 ... 16			
450E-0006-FH-xxKR-...	RLK0004		2.5 ... 16			
450E-0012-FH-xxKR-...	RLK0004		2.5 ... 16			
530B-0010-FH-xxKR-...	RLK0004		2.5 ... 16			
530C-0010-FH-xxKR-...	RLK0004	WEF ¹⁾	2.5 ... 16			
530C-0014-FH-xxKR-...	RLK0004		2.5 ... 16			
530D-0012-FH-xxKR-...	RLK0004		2.5 ... 16			
530E-0010-FH-xxKR-...	RLK0004		2.5 ... 16	RTE for thread M8	See motor dimension sheet	see → Tab.
530F-0012-FH-xxKR-...	RLK0004		2.5 ... 35			
530G-0006-FH-xxKR-...	RLK1300		2.5 ... 35			
530G-0007-FH-xxKR-...	RLK1300		2.5 ... 35			
530G-0010-FH-xxKR-...	RLK1300		2.5 ... 35			
530L-0003-FH-xxKR-...	RLK1300		2.5 ... 35			
530L-0006-FH-xxKR-...	RLK1300		2.5 ... 35			
530L-0007-FH-xxKR-...	RLK1300		2.5 ... 35			
530P-0012-FH-xxKR-...	RLK0004		2.5 ... 35			
530R-0011-FH-xxKR-...	RLK0004		2.5 ... 35			

1) WEF = wire end ferrule

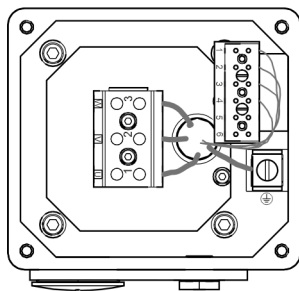
2) RTE = ring terminal end



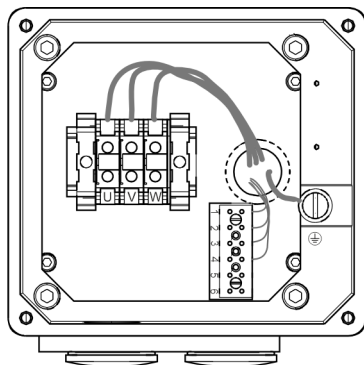
- Do not remove or damage the seal glued in the cover of the terminal box.
- Note the size of the cable gland and connection thread for the cable inlet into the terminal box.
- Pay particular attention to the orderly and tension-free routing of the connection cables in the terminal box in order to avoid chafing or pressure points 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



MST360x-__-FH_KR-...



MST450x-__-FH_KR-...

MST530B-__-FH_KR-...
MST530C-__-FH_KR-...
MST530D-__-FH_KR-...
MST530E-__-FH_KR-...
MST530F-__-FH_KR-...
MST530P-__-FH_KR-...
MST530R-__-FH_KR-...

Fig. 25: Terminal boxes MST360 / -450 / -530B, -C, -D, -E, -F, -P, -R

Connection overview terminal boxes

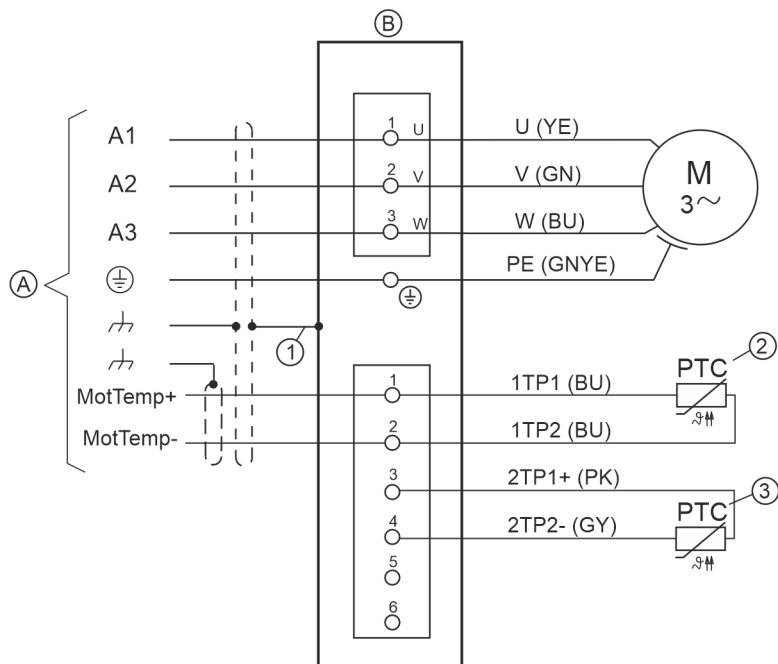
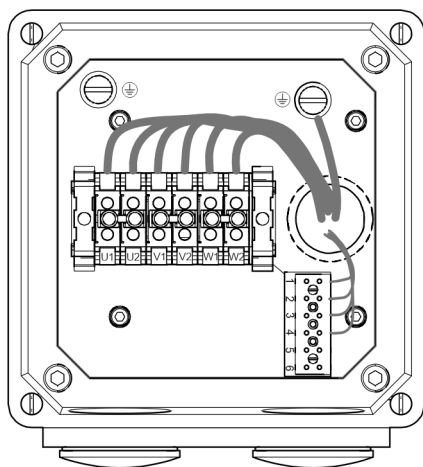


Fig. 26: Overview of connections to the terminal box

- ① Total shield connection via cable clamp of strain relief in the cable gland
- ② For temperature sensor for motor protection refer to Fig. 24
- ③ Temperature sensor for external temperature measuring see Fig. 24

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

Terminal box at MST530G / MST530L



MST530G-__-FH-_KR-...
MST530L-__-FH-_KR-...

Fig. 27: Terminal box RLK1300 (double cabling)

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

Overview of double cabling

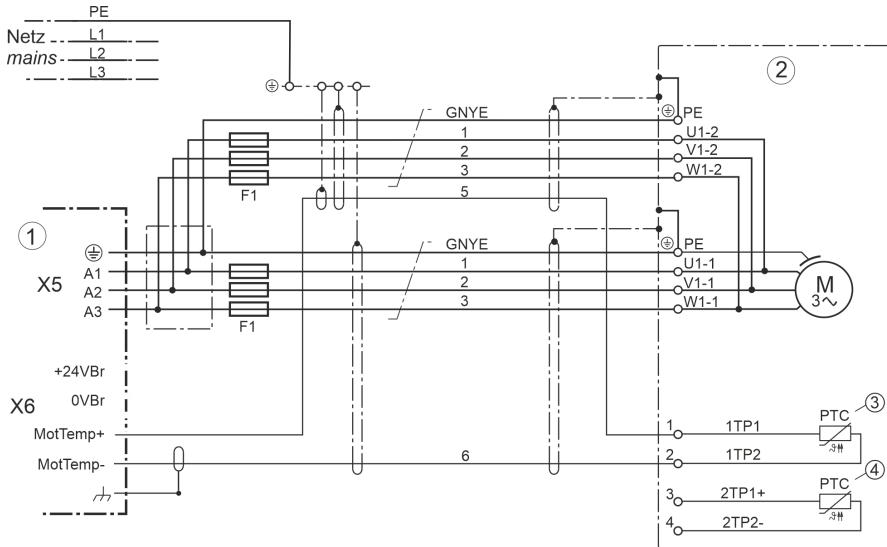


Fig. 28: Double cabling connection diagram

- ① Bosch Rexroth controller
- ② Motor terminal box
- ③ Temperature sensor for thermal motor protection see Fig. 24
- ④ Temperature sensor for external temperature monitoring see Fig. 24



- 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:

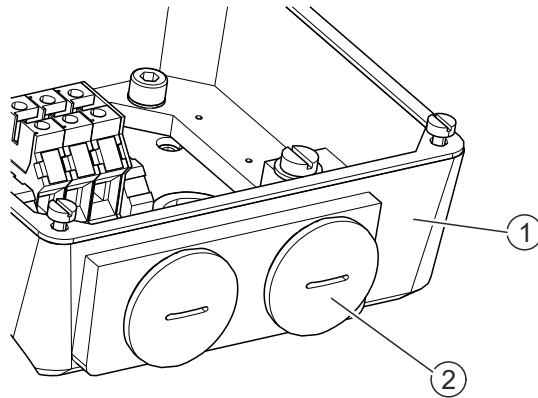


Fig. 29: Cable gland at terminal box

Terminal box

Safety cover of cable gland

1. ➔ Open the terminal box cover.
2. ➔ Unscrew the safety cover of the cable gland ②.

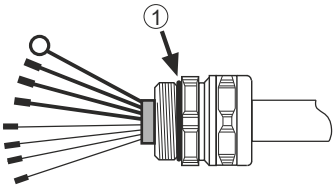


Fig. 30: O-ring at cable gland

① Position of the O-ring

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.

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:

Table 23: Screw tightening torques in Nm (± 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-...				
MST530C-xxxx-FH-xxKR-...				
MST530D-xxxx-FH-xxKR-...	RLK0004	1.5	-/-	3.5
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-...				

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.

6.3.3 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 grounding cable with a ring cable lug via this 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.

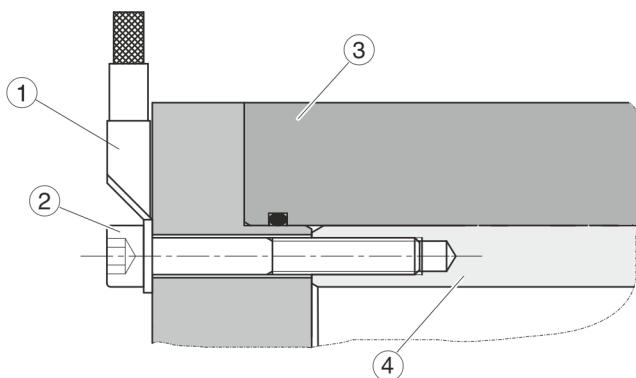


Fig. 31: Design ground connection - example

- ① Ground connection
- ② Brass screw M5 or M6

- ③ Spindle housing
- ④ Stator

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.

6.3.4 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, temperature sensor SNM.150.DK must 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.
- KTY84-130 is an ESD sensitive device! For this reason, the stranded wires of the sensor are protected by a protective foil at the connection cable. Before connecting the sensor, take measures regarding 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.



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

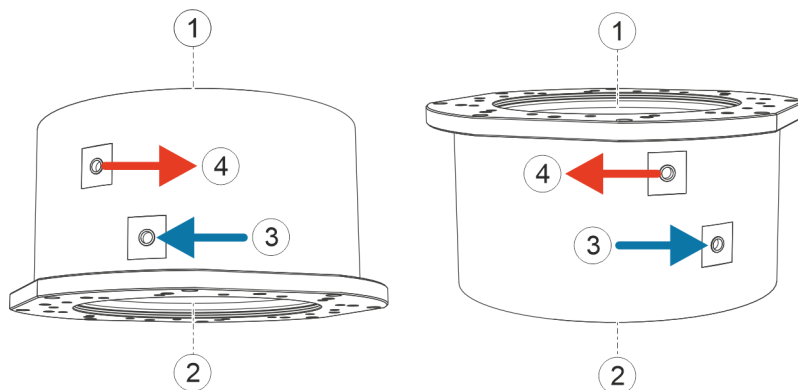


Fig. 32: In- and outlet direction of coolant

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



- 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.

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 Environmental conditions during operation

Environmental conditions during operation

Environmental conditions during operation are defined according to EN IEC 60721-3-3:2019 in different classes. They are based on worldwide long-term experiences and take all influencing variables into account, e.g., air temperature and air humidity.

Table 24: Allowed classes of environmental conditions during operation according to EN IEC 60721-3-3:2019

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

Based on EN IEC 60721-3-3:2019, some limit values are partially defined in the following, which our products are allowed to be exposed to during operation. Unless otherwise specified, the values given are the values of the particular class. Observe the detailed description of the classifications to take all of the factors which are specified in the particular class into account.

However, Bosch Rexroth reserves the right to adjust these values at any time based on future experiences or changed environmental factors.

Table 25: Allowed operation conditions

Environmental factor	Unit	Value
Temperature	°C	0 ... +40 ¹⁾ +5 ... +40 ²⁾
Relative air humidity	%	5 ... 95 ¹⁾
Absolute air humidity	g/m ³	1 ... 29 ¹⁾
Installation altitude	m	up to 1,000 m above sea level

¹⁾ Deviating from EN IEC 60721-3-3:2019

²⁾ for water cooling

7.3 Commissioning



The motor can be operated only after installation into a machine. For start up, please observe the documentation of all system components. For detailed start up procedure of the motors refer to the ➔ [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 2.5 “Product- and technology-dependent safety instructions”](#) on page 23.

7.4 Operation

During operation, keep the ambient and operation conditions and technical data specified in the ➔ [MBT Project planning manual](#).

Checks during operation:

1. ➞ Pay attention to exceptional noise.
2. ➞ Pay attention to increased vibrations.
3. ➞ Check the motor for cleanliness.
4. ➞ Check the tightness of the coolant connections.
5. ➞ 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 88.

7.5 Operation with third-party controllers

Rate of rise of voltage

The electrical insulation system of the motor is subject to a higher dielectric load in converter mode than when it is operated with a merely sinusoidal source voltage. The voltage load of the winding insulation in converter mode is mainly defined by the following factors:

- Crest value of voltage
- Rise time of pulses at the motor terminals
- Switching frequency of final converter stage
- Length of power cable to the motor

Main components are the switching times of the final converter stage and the length of the power cable to the motor. The rates of rise of the voltage occurring at the motor may not exceed the pulse voltage limits specified in **DIN VDE 0530-25 (VDE 0530-25): 2009-08 (picture 14, limit curve A)**, measured at the motor terminals of two strands in relation to the rise time.



These limits are complied with by the final stages of Rexroth converters.

8 Maintenance

8.1 Cleaning and servicing

▲ WARNING



Operations in the vicinity of live parts are extremely dangerous.

- Work required on the electric system may only be carried out by skilled electricians. Tools for electricians (VDE tools) are absolutely necessary.
 - Isolate (even auxiliary circuits).
 - Secure against reactivation.
 - Ensure de-energization.
 - Ground and short-circuit.
 - Cover or shield any adjacent live parts.

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

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

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

- Allow the motors to cool down prior to commencing work.
Wear safety gloves.
Do not work on hot surfaces.

Motors

Dirt, dust or chips may adversely affect the functionality of the motors and, in extreme cases, even cause a failure of the motors. Therefore, in regular intervals (after one year at the latest), you should clean the surface of the motors in order to achieve a sufficiently large heat radiation surface. If the cooling fins are partially covered with dirt, sufficient heat dissipation via the ambient air is no longer possible.

Insufficient heat dissipation can have undesirable consequences. The bearing life is reduced by operation at inadmissibly high temperatures (bearing grease decomposes). Overtemperature switch-off despite operation on the basis of selected data, because the appropriate cooling is missing.

Connection cables**⚠ WARNING****Electric shock due to contact with live parts!**

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

- Check the connection cable for damage at regular intervals and replace it if necessary.
- Check optionally existing drag chains on defects.
- Check the protective conductor connection at regular intervals for proper condition and tight fit and replace if necessary.

8.2 Service repair, maintenance and spare parts

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

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

- Noticeable sound during operation
- State of power and encoder cables in a drag chain.
- Rated current of the motor

Table 26: Maintenance measures

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.



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

Service Germany

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

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

Table 27: Service Helpdesk

Telephone:	+49 9352 40 5060
Fax:	+49 9352 18 4941
Email:	↪ service.svc@boschrexroth.de
Internet:	↪ www.boschrexroth.com

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

Service worldwide

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

Preparing information

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

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

9 Disassembly

9.1 General notes about 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.

⚠ 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.

NOTICE

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

Basic procedure for disassembly:

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. Secure 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. ➔ Right after disassembly, store or transport the motor components in its origin package.
10. ➔ If necessary, record all measures in the commissioning log or machine maintenance plan.

NOTICE**Information on stators with encapsulation "T"**

During disassembly, please observe to disassembled all stator parts. Ensure that the separator between inlet and outlet at the cooling jacket is also removed from the machine after disassembling the stator.

10 Environmental protection and disposal

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

Recycling

Most of the products can be recycled due to their high content of metal. In order to recycle the metal in the best possible way, the products must be disassembled into individual assemblies. Metals contained in electric and electronic assemblies can also be recycled by means of special separation processes.

Basic components

Basically, our motors consist of the following components:

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

Plastic parts of the products may contain flame retardants. These plastic parts are labeled according to EN ISO 1043-1:2011 + A1:2016. They have to be recycled separately or disposed of according to the applicable legal provisions.

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 like watches, credit cards, ...

**Remark**

The permanent magnets must be demagnetized before disposal to avoid injuries or damage. The demagnetization is reached via thermal treatment. The duration of the treatment depends on the size (guide value: 300 °C, 30 min).

Packaging

Our packaging materials do not contain any problematic materials and can therefore be easily disposed. Packaging materials are: wood, cardboard and polystyrene.

Batteries and accumulators



The symbol indicating "separate collection" for all batteries and accumulators is the crossed-out wheeled bin. End users in the EU are legally bound to return used batteries and accumulators. Outside the scope of the EU Directive 2006/66/EC, the applicable regulations must be followed. Batteries and accumulators can contain hazardous substances which can harm the environment or people's health when improperly stored or disposed of. The batteries or accumulators must be returned to the country-specific collection systems for proper disposal.

Disposal by the manufacturer

Our products can be returned to us for disposal. However, this requires that the products are free from oil, grease or other dirt. The motor components must be returned in a suitable packaging (origin package if possible). In the case of a transport by air freight, please observe the dangerous goods regulations (IATA) for the secondary part.

Send the products to the following address, carriage free:

Bosch Rexroth AG
Bgm.-Dr.-Nebel-Str. 2
97816 Lohr a.Main, Germany

11 Troubleshooting

11.1 Procedure

Possible causes for failures of 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. Observe the instructions in the corresponding documentation.

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

Table 28: Failure condition

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
	Foreign bodies within the motor	Stop the motor --> repair by manufacturer
Running noise	Bearing is damaged	Stop the motor --> repair by manufacturer
	Operation outside of rated data	Reduce load and check the dimensioning
High motor temperatures	Heat dissipation is impaired	Clean the motor
	Motor temperature monitoring is activated	For liquid cooling, check cooling circuit.
Wrong or defective temperature display	Temperature sensor not connected	Connect temperature sensor
	Temperature sensor defective	Stop the motor --> repair by manufacturer
		Connect backup temperature sensor



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

12.2.1 EU Declaration of conformity



EU-Konformitätserklärung - Original EU declaration of conformity

Dok.-Nr. / Doc. No.: DCTC-30316-003

Datum / Date: 2022-09-21

- ☐ nach Maschinenrichtlinie 2006/42/EG / in accordance with Machinery Directive 2006/42/EC
☒ nach Niederspannungsrichtlinie 2014/35/EU / in accordance with Low Voltage Directive 2014/35/EU
☒ nach EMV-Richtlinie 2014/30/EU / in accordance with EMC Directive 2014/30/EU
☐ nach ATEX-Richtlinie 2014/34/EU / in accordance with ATEX Directive 2014/34/EU
☐ nach Ökodesign-Richtlinie (ErP) 2009/125/EG (Verordnung ...) / in accordance with Ecodesign Directive (ErP) 2009/125/EC (Commission Regulation ...)
☐ Produkt im Geltungsbereich der RoHS-Richtlinie 2011/65/EU / Product in the scope of RoHS Directive 2011/65/EU:
nach RoHS-Richtlinie 2011/65/EU / in accordance with RoHS Directive 2011/65/EU
☒ Produkt nicht im Geltungsbereich der RoHS-Richtlinie 2011/65/EU / Product not in the scope of RoHS Directive 2011/65/EU:
Produkt erfüllt die Anforderungen zur Stoffbeschränkung der Richtlinie / Product meets the substance restriction requirements of the directive

Geltungsbereich RoHS-Richtlinie für Produkte des Herstellers: DCTC-30806-006 „Herstellererklärung zur RoHS-Richtlinie 2011/65/EU & 2015/863/EU“ /
Scope of RoHS Directive for products of the manufacturer: DCTC-30806-006 "Declaration of compliance to the RoHS Directive 2011/65/EU & 2015/863/EU"

Hiermit erklärt der Hersteller, / The manufacturer

Bosch Rexroth AG, Bgm.-Dr.-Nebel-Str. 2, 97816 Lohr a.Main / Germany

dass die nachstehenden Produkte / hereby declares that the products below

Bezeichnung / Name: 3-PHASE SYNCHRONOUS MOTOR

Baureihen /
Series:

	Rotor / rotor	Stator / stator
MBT...0...	MRT...0...	MST...0...
MBT...1...	MRT...1...	MST...1...

Handelsbezeichnung / Trade name: Rexroth

ab Herstellungsdatum / from the date of manufacture: 2022-09-21

in Übereinstimmung mit oben genannte(n) Richtlinie(n) entwickelt, konstruiert und gefertigt wurden. / were developed, designed and manufactured in compliance with the above-mentioned directive(s).

Die alleinige Verantwortung für die Ausstellung dieser EU-Konformitätserklärung trägt der Hersteller. / This EU declaration of conformity is issued under the sole responsibility of the manufacturer.

EU-Konformitätserklärung - Original
EU declaration of conformity

Seite Page 2 / 2
DCTC-30316-003 : 2022-09-21

Angewendete harmonisierte Normen bzw. sonstige technische Normen und Vorschriften. /
Applied harmonized standards or other technical standards and regulations:

Norm / Standard	Titel / Name	Ausgabe / Issue
EN 60034-1 (IEC 60034-1)	Drehende elektrische Maschinen – Teil 1: Bemessung und Betriebsverhalten / Rotating electrical machines – Part 1: Rating and performance	2010 + Cor.:2010 (2010, modifiziert)
EN IEC 60034-5 (IEC 60034-5)	Drehende elektrische Maschinen – Teil 5: Schutzarten aufgrund der Gesamtkonstruktion von drehenden elektrischen Maschinen (IP-Code) – Einteilung / Rotating electrical machines – Part 5: Degrees of protection provided by integral design of rotating electrical machines (IP code) - Classification	2020 (2020)
EN IEC 61800-3 (IEC 61800-3)	Drehzahlveränderbare elektrische Antriebe – Teil 3: EMV-Anforderungen einschließlich spezieller Prüfverfahren / Adjustable speed electrical power drive systems – Part 3: EMC requirements and specific test methods	2018 (2017)

Weitere Erläuterungen / Further explanations:

Die Montage- und Installationshinweise gemäß Produktdokumentation sind zu beachten. / The assembling and installation
instructions according to the manual have to be followed.

Lohr a.Main
Ort / Place

2022-09-21
Datum / Date

ppa.
Uwe Czychy
Technische Werkleitung /
Plant Manager

i.V. / p.p.
Dr. Hans-Jürgen Wehner
Product Owner Servo Motors and
Gear boxes

Änderungen im Inhalt der EU-Konformitätserklärung sind vorbehalten. Derzeit gültige Ausgabe auf Anfrage.
We reserve the right to make changes to the content of the EU Declaration of Conformity. Current issue on request.

12.2.2 UKCA Declaration of conformity



UK Declaration of Conformity

Doc. No.: DCTC-30316-033

Date: 2022-08-16

- ☐ in accordance with Supply of Machinery (Safety) Regulation 2008, S.I. 2008/1597
- ☒ in accordance with Electrical Equipment (Safety) Regulation 2016, S.I. 2016/1101
- ☒ in accordance with Electromagnetic Compatibility Regulation 2016, S.I. 2016/1091
- ☐ in accordance with Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres Regulations 2016, S.I. 2016/1107
- ☐ in accordance with Ecodesign for Energy-Related Products and Energy Information (Amendment) (EU Exit) Regulations 2019, S.I. 2019/539
- ☐ in accordance with Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012, S.I. 2012/3032

Scope of RoHS Directive for products of the manufacturer:
DCTC-30806-006 "Declaration of compliance to the RoHS Directive 2011/65/EU & 2015/863/EU"

The manufacturer

Bosch Rexroth AG, Bgm.-Dr.-Nebel-Str. 2, 97816 Lohr a.Main / Germany

hereby declares that the products below

Name: 3-PHASE SYNCHRONOUS MOTOR

Series:	Rotor	Stator
MBT...0...	MRT...0...	MST...0...
MBT...1...	MRT...1...	MST...1...

Trade name: Rexroth
from the date of manufacture: 2022-08-16

were developed, designed and manufactured in compliance with the above-mentioned statutory instrument(s).

This UK Declaration of Conformity is issued under the sole responsibility of the manufacturer.

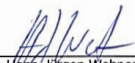
Designated Standards or other technical standards and regulations applied:

Standard	Name	Issue
EN 60034-1	Rotating electrical machines – Part 1: Rating and performance	2010 + Cor.:2010
EN 60034-5	Rotating electrical machines – Part 5: Degrees of protection provided by integral design of rotating electrical machines (IP code) - Classification	2001/A1:2007
EN 61800-3	Adjustable speed electrical power drive systems – Part 3: EMC requirements and specific test methods	2004/A1:2012

UK Declaration of Conformity

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DCTC-30316-033:2022-08-16

Further explanations:
The assembling and installation instructions according to the manual have to be followed.

Lohr a.Main	,	2022-08-16	ppa.		p.p.	
Place		Date		Uwe Czychy Plant Manager LoP2		Dr. Hans-Jürgen Wehner Product Owner Servo Motors and Gear Boxes

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

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