

KTZ/KTZE Series

Submersible Dewatering Pumps

OPERATION MANUAL

INTRODUCTION

Thank you for selecting the Tsurumi KTZ or KTZE Submersible Dewatering Pumps.

This equipment should not be used for applications other than those listed in this manual. Failure to observe this precaution may lead to a malfunction or an accident. In the event of a malfunction or an accident, the manufacturer will not assume any liability. After reading this Operation Manual, keep it in a location that is easily accessible, so that it can be referred to whenever information is needed while operating the equipment.

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安全须知

- 请勿在任何非规定条件下操作本产品。不遵守此注意事项可能会导致漏电、触电、火灾、溢水或其他问题。
- 如果水池或水坑中有人，切勿尝试操作本产品。如果发生漏电，则会造成触电。
- 请勿在铭牌上所示电压（电压容许限度为 $\pm 5\%$ 以内）除外的任何电压下操作本产品。如果使用发电机进行操作，强烈建议不要使用同一发电机操作其他设备。否则可能造成产品故障和损坏，从而导致漏电或触电。
- 所有电气工程（包括电缆延伸）都必须由授权电工进行，并遵照贵国的所有现行法规。切勿允许未授权人员进行电气工程，因为这不仅违法，而且极其危险。
- 请务必提供适合泵的专用接地漏电断路器（额定灵敏电流不得超过 30 mA）和热过载继电器（两者均为市售品）。不遵守此警告会在发生产品故障或漏电时造成触电或爆炸。
- 请提供本产品专用的可靠接地点。请勿将地线连接到煤气管、水管、避雷针或电话地线。接地不当会造成触电。
- 请勿使用已损坏或装配不紧密的电缆、电源插头或电源插座。损坏的电缆必须由有资格的人员进行更换。请将电缆的每根导线牢固连接至各端子。否则会导致触电、短路或火灾。
- 切勿将电缆的末端或电源插头浸入水中。这可能会导致产品损坏、漏电、触电或火灾。
- 请勿擦伤、折叠、拉扯、扭曲、改装或捆扎电缆，或将其用作吊具。否则电缆可能会损坏，因而造成漏电、短路、触电或火灾。
- 开始维护或检查之前，请务必关闭电源或断开插头，这样泵就不会意外启动。请勿湿手作业。若不遵守这些注意事项可能导致触电或伤害。

為確保您的安全請務必閱讀下列資訊

- 請勿在指定狀況之外的任何狀況下操作本產品。若不遵守本注意事項可能導致漏電、電擊、火災、溢水或其他問題。
- 若水池或集水坑中有人，絕勿嘗試操作本產品。萬一發生漏電，可能造成電擊。
- 請勿在銘牌上所述電壓（容許限度 $\pm 5\%$ ）之外的任何電壓之下操作本產品。若用發電機來進行操作，強烈建議勿以相同發電機操作其他設備。若不遵守本注意事項可能造成產品故障和損壞，進而導致漏電或電擊。
- 所有電氣工作（包括纜線延長）必須由獲授權電工依據貴國所有適用法規來執行。絕勿允許未獲授權人員執行電氣工作，因為這不僅違法，更是極度危險。
- 請務必提供適合泵的專用接地漏電斷路器（具有不超過 30 mA 的額定靈敏度電流）以及熱過載繼電器（這兩種裝置可在市面上買到）。若不依循本警告事項，產品發生故障或漏電時，可能造成電擊或爆炸。
- 請為本產品提供專用的可靠接地點。請勿將接地線連接到瓦斯管、水管、避雷針或電話接地線。接地不當可能造成電擊。
- 如果纜線、電源插頭或電源插座損壞或無法緊密吻合，請勿使用。損壞的纜線必須由合格人員予以更換。請將纜線的每一根導線安全連接到端子上。若未能遵守這一點，可能造成電擊、短路或火災。
- 絕勿將纜線末端或電源插頭浸入水中。否則可能造成產品損壞、漏電、電擊或火災。
- 請勿刮傷、折疊、拉動、扭轉、改裝或捆束纜線，或將纜線作為吊具使用。否則纜線可能損壞，進而造成漏電、短路、電擊或火災。
- 開始維護或檢查之前，請務必關閉電源或拔出插頭，以避免泵意外啟動。請勿以濕手工作。若不遵守這些注意事項，可能造成電擊或傷害。

HÃY ĐỌC KỸ ĐỂ ĐẢM BẢO AN TOÀN CHO BẠN

- Không vận hành sản phẩm trong bất kỳ điều kiện nào ngoài những điều kiện được chỉ định. Không tuân thủ các quy tắc phòng ngừa có thể dẫn đến rò rỉ điện, điện giật, hỏa hoạn, tràn nước hoặc các vấn đề khác.
- Tuyệt đối không cố vận hành sản phẩm khi có người tại hồ nước hoặc bể chứa. Nếu rò rỉ điện xảy ra, có thể gây điện giật.
- Không vận hành sản phẩm ở điện áp khác với điện áp được ghi trên tem nhãn với giới hạn dung sai điện áp trong khoảng $\pm 5\%$. Nếu vận hành với máy phát điện, chúng tôi đặc biệt khuyến cáo bạn không nên vận hành thiết bị nào khác với cùng máy phát điện này. Không tuân thủ các quy tắc phòng ngừa có thể gây ra trục trặc và hư hỏng sản phẩm, điều này có thể dẫn đến rò rỉ điện hay điện giật.
- Tất cả các công việc liên quan đến điện (bao gồm cả nối dài cáp) phải được thực hiện bởi thợ điện có chuyên môn và phải tuân thủ tất cả các quy định tại quốc gia của bạn. Tuyệt đối không được để một người thợ điện không có chuyên môn thực hiện công việc này vì điều này không chỉ trái pháp luật mà còn có thể cực kỳ nguy hiểm.
- Nhất định phải sử dụng cầu dao chống rò điện đất chuyên dụng (có độ nhạy dòng điện không vượt quá 30 mA) và rơ le nhiệt bảo vệ quá tải phù hợp với máy bơm (cả hai đều có sẵn trên thị trường). Không tuân thủ theo cảnh báo này có thể gây điện giật hoặc cháy nổ khi sản phẩm hư hỏng hoặc xảy ra rò rỉ điện.
- Sử dụng thiết bị nối đất an toàn chuyên dụng cho sản phẩm. Không gắn dây nối đất với ống dẫn ga, ống nước, cột thu lôi hoặc dây nối đất của điện thoại. Nối đất không đúng cách có thể gây điện giật.
- Không sử dụng dây cáp, phích cắm điện hoặc ổ cắm điện nếu các thiết bị này bị hỏng hay không được gắn chặt. Cáp bị hỏng phải được thay bởi thợ có tay nghề. Kết nối tất cả dây dẫn của cáp với các thiết bị đầu cuối một cách chắc chắn. Không tuân thủ các bước này có thể dẫn đến giật điện, chập điện hoặc hỏa hoạn.
- Tuyệt đối không để các đầu dây cáp hoặc phích cắm điện bị nhúng nước. Điều này có thể làm hư hỏng sản phẩm, rò rỉ điện, giật điện hoặc hỏa hoạn.
- Không làm xước, gấp, kéo, xoắn, làm biến dạng hoặc bó các sợi cáp, hoặc sử dụng dây cáp như một thiết bị nâng. Dây cáp có thể bị hư hỏng, dẫn đến các sự cố rò rỉ điện, chập điện, giật điện hoặc hỏa hoạn.
- Trước khi bắt đầu bảo trì hay kiểm tra, nhất định phải tắt nguồn điện hoặc rút phích cắm điện, tránh trường hợp máy bơm vô tình khởi động. Không làm việc với tay ướt. Không tuân thủ các bước này có thể dẫn đến giật điện hoặc bị thương.

กรุณาอ่านข้อความนี้เพื่อความปลอดภัยของคุณ

- ห้ามใช้งานผลิตภัณฑ์ภายใต้สภาวะอื่นใดนอกเหนือจากที่ระบุไว้ หากไม่สามารถปฏิบัติตามข้อควรระวัง อาจส่งผลให้เกิดไฟรั่ว ไฟช็อต เพลิ่งไหม้ น้ำล้น หรือปัญหาอื่นๆ ได้
- ห้ามพยายามใช้งานผลิตภัณฑ์หากมีบุคคลอื่นอยู่ในสระน้ำหรือบ่อน้ำ เนื่องจากหากเกิดไฟรั่วขึ้น อาจทำให้เกิดไฟช็อตได้
- ห้ามใช้งานผลิตภัณฑ์ภายใต้แรงดันไฟฟ้าอื่นใดนอกเหนือจากที่ระบุไว้บนป้าย ซึ่งมีเกณฑ์ความปลอดภัยเคลื่อนของแรงดันไฟฟ้าอยู่ที่ $\pm 5\%$ หากมีการใช้งานกับเครื่องกำเนิดไฟฟ้า แนะนำเป็นอย่างยิ่งว่าไม่ให้ใช้งานกับอุปกรณ์อื่นด้วยเครื่องกำเนิดไฟฟ้าเครื่องเดียวกัน หากไม่สามารถปฏิบัติตามคำเตือนนี้ อาจส่งผลให้เกิดการทำงานผิดปกติ และผลิตภัณฑ์พังเสียหาย ซึ่งส่งผลให้เกิดไฟรั่วหรือไฟช็อตได้
- งานด้านไฟฟ้าทั้งหมด(รวมไปถึงการต่อสายเคเบิล) จะต้องดำเนินการโดยช่างไฟฟ้าที่ได้รับอนุญาต ซึ่งเป็นการปฏิบัติตามระเบียบที่มีการกำหนดไว้ในประเทศของคุณ ห้ามไม่ให้ผู้ที่ไม่มีใบอนุญาตดำเนินงานด้านไฟฟ้าโดยเด็ดขาด เพราะไม่เพียงแต่จะเป็นการฝ่าฝืนกฎหมาย แต่ยังอาจเกิดอันตรายอย่างยิ่งได้ด้วย
- จัดให้มีการใช้เบรกเกอร์แบบมีระบบสายดินโดยเฉพาะ (โดยมีกระแสรั่วไหลได้ไม่เกิน 30mA) และใช้อิโวลต์รีเลย์แบบทำงานด้วยความร้อนที่เหมาะสมกับขนาดของบีม (อุปกรณ์ทั้งสองชนิดนี้มีจำหน่ายทั่วไป) หากไม่สามารถปฏิบัติตามสัญญาณเตือนนี้ อาจส่งผลให้เกิดไฟช็อต หรือระเบิดเมื่อผลิตภัณฑ์ไม่สามารถทำงาน หรือเกิดไฟรั่วได้
- จัดให้มีระบบสายดินที่ปลอดภัยสำหรับผลิตภัณฑ์นี้โดยเฉพาะ ห้ามเชื่อมต่อสายดินเข้ากับท่อก๊าซ ท่อน้ำ สายล่อฟ้า หรือสายดินของโทรศัพท์ ระบบสายดินที่ไม่เหมาะสมอาจทำให้เกิดไฟช็อตได้
- ห้ามใช้สายเคเบิล ปลั๊กไฟ หรือเต้าเสียบที่ชำรุดหรือหลวม สำหรับสายเคเบิลที่ชำรุดจะต้องมีการเปลี่ยนด้วยบุคลากรที่มีคุณสมบัติครบถ้วน ให้เชื่อมต่อสายตัวนำทุกตัวของสายเคเบิลเข้ากับขั้วต่อให้แน่นหนา หากไม่สามารถปฏิบัติตามได้ อาจส่งผลให้เกิดไฟช็อต ไฟลัดวงจร หรือเพลิ่งไหม้ได้
- ห้ามจุ่มปลายของสายเคเบิลหรือปลั๊กไฟลงในน้ำโดยเด็ดขาด การกระทำดังกล่าวอาจส่งผลให้ผลิตภัณฑ์ชำรุดเสียหาย ไฟรั่ว ไฟช็อต หรือเพลิ่งไหม้ได้
- ห้ามครูด พับ ดึง บิด ดัดแปลง หรือมัดรวมสายเคเบิล หรือใช้เป็นอุปกรณ์สำหรับยกของ สายเคเบิลอาจชำรุด ซึ่งเป็นเหตุให้เกิดไฟรั่ว ไฟลัดวงจร ไฟช็อต หรือเพลิ่งไหม้ได้
- ก่อนเริ่มการซ่อมบำรุงหรือตรวจสอบใดๆ ให้ปิดแหล่งจ่ายไฟให้สนิทหรือถอดปลั๊ก เพื่อป้องกันไม่ให้บีมเริ่มทำงานโดยบังเอิญ และห้ามใช้งานขณะมีมือเปียก หากไม่สามารถปฏิบัติตามคำเตือนเหล่านี้ อาจส่งผลให้เกิดไฟช็อต หรือเกิดการบาดเจ็บได้

PASTIKAN UNTUK MEMBACA DEMI KESELAMATAN ANDA

- **Jangan operasikan produk dalam kondisi apa pun selain dari yang ditentukan.** Kegagalan untuk mematuhi tindakan pencegahan dapat menyebabkan kebocoran listrik, sengatan listrik, kebakaran, luapan air atau masalah lainnya.
- **Jangan pernah mencoba mengoperasikan produk jika seseorang berada di kolam atau wadah minyak.** Jika terjadi kebocoran listrik, hal itu dapat menyebabkan sengatan listrik.
- **Jangan operasikan produk dalam tegangan apa pun selain yang dijelaskan pada papan nama dengan batas toleransi tegangan $\pm 5\%$.** Jika dioperasikan dengan generator, sangat disarankan untuk tidak mengoperasikan peralatan lain dengan generator yang sama. Kegagalan mematuhi peringatan ini dapat menyebabkan kegagalan fungsi dan kerusakan produk, yang dapat menyebabkan kebocoran listrik atau sengatan listrik.
- **Semua pekerjaan listrik (termasuk ekstensi kabel) harus dilakukan oleh ahli listrik yang berwenang, sesuai dengan semua peraturan yang berlaku di negara Anda.** Jangan pernah mengizinkan orang yang tidak berwenang melakukan pekerjaan listrik karena tidak hanya melanggar hukum, tetapi juga bisa sangat berbahaya.
- **Benar-benar menyediakan pemutus sirkuit kebocoran tanah khusus (memiliki arus sensitivitas terukur tidak melebihi 30 mA) dan relai kelebihan beban termal yang cocok untuk pompa (keduanya tersedia di pasar).** Gagal mengikuti peringatan ini dapat menyebabkan sengatan listrik atau ledakan ketika produk gagal atau terjadi kebocoran listrik.
- **Berikan pentanahan aman yang didedikasikan untuk produk.** Jangan hubungkan kabel arde ke pipa gas, pipa air, penangkal petir, atau kabel arde telepon. Pentanahan yang tidak benar dapat menyebabkan sengatan listrik.
- **Jangan gunakan kabel, steker listrik, atau stopkontak jika rusak atau tidak dipasang dengan erat.** Kabel yang rusak harus diganti oleh orang yang berwenang. Hubungkan setiap konduktor kabel dengan aman ke terminal. Kegagalan untuk mengamati ini dapat menyebabkan sengatan listrik, hubungan pendek, atau kebakaran.
- **Jangan pernah merendam ujung kabel atau steker listrik ke dalam air.** Ini dapat menyebabkan kerusakan pada produk, kebocoran listrik, sengatan listrik, atau kebakaran.
- **Jangan menggores, melipat, menarik, memelintir, membuat perubahan, atau mengikat kabel, atau menggunakannya sebagai alat pengangkat.** Kabel mungkin rusak, yang dapat menyebabkan kebocoran listrik, hubungan pendek, sengatan listrik, atau kebakaran.
- **Sebelum memulai perawatan atau inspeksi, matikan catu daya sepenuhnya atau lepaskan steker sehingga pompa tidak dapat memulai secara tidak sengaja.** Jangan bekerja dengan tangan basah. Gagal mematuhi peringatan ini dapat menyebabkan sengatan listrik atau cedera.

PASTIKAN ANDA MEMBACA UNTUK KESELAMATAN ANDA

- Jangan mengoperasikan produk dalam keadaan apa-apa syarat selain daripada yang dinyatakan. Kegagalan untuk mematuhi langkah berjaga-jaga boleh menyebabkan kebocoran elektrik, kejutan elektrik, kebakaran, limpahan air atau masalah lain.
- Jangan pernah cuba mengoperasikan produk jika ada orang di kolam atau baki. Sekiranya kebocoran elektrik berlaku, ia boleh menyebabkan kejutan elektrik.
- Jangan operasikan produk di bawah mana-mana voltan selain daripada yang dinyatakan pada papan nama dengan had toleransi voltan $\pm 5\%$. Jika ia dioperasikan dengan generator, sangat disyorkan untuk tidak mengoperasikan peralatan lain dengan generator yang sama. Kegagalan mematuhi amaran ini boleh menyebabkan pincang tugas dan kerosakan produk, yang mungkin menyebabkan kebocoran elektrik atau kejutan elektrik.
- Semua kerja elektrik (termasuk sambungan kabel) mesti dilakukan oleh juruelektrik yang diberi kuasa, selaras dengan semua peraturan yang berlaku di negara anda. Jangan sekali-kali membenarkan seseorang yang tidak dibenarkan melakukan kerja elektrik kerana ia bukan sahaja melanggar undang-undang, tetapi ia juga boleh menjadi sangat berbahaya.
- Pastikan untuk benar memberikan pemutus litar kebocoran bumi khusus (mempunyai kepekaan arus yang tidak melebihi 30 mA) dan relai beban lebih terma yang sesuai untuk pam (kedua-duanya terdapat di pasaran). Kegagalan mematuhi peringatan ini boleh menyebabkan kejutan atau letupan elektrik apabila produk gagal atau kebocoran elektrik berlaku.
- Sediakan grounding yang selamat untuk produk. Jangan sambungkan dawai tanah ke paip gas, paip air, tongkat cahaya, atau dawai tanah telefon. Grounding yang salah boleh menyebabkan kejutan elektrik.
- Jangan gunakan kabel, palam kuasa atau soket kuasa jika rosak atau tidak dipasang dengan teliti. Kabel yang rosak mesti diganti oleh orang yang berkelulusan. Sambung setiap konduktor kabel dengan selamat ke terminal. Kegagalan mematuhi perkara ini boleh menyebabkan kejutan elektrik, litar pintas, atau kebakaran.
- Jangan menenggelamkan hujung kabel atau palam kuasa di dalam air. Ini boleh mengakibatkan kerosakan produk, kebocoran elektrik, kejutan elektrik, atau kebakaran.
- Jangan menggores, melipat, tarik, memutar, membuat perubahan, atau mengikat kabel, atau menggunakannya sebagai peranti untuk mengangkat. Kabel mungkin akan rosak, yang boleh menyebabkan kebocoran elektrik, litar pintas, kejutan elektrik, atau kebakaran.
- Sebelum memulakan penyenggaraan atau pemeriksaan, matikan bekalan kuasa sepenuhnya atau cabut palam supaya pam tidak boleh bermula secara tidak sengaja. Jangan bekerja dengan tangan basah. Kegagalan mematuhi peringatan ini boleh membawa kepada kejutan atau kecederaan elektrik.

SIGURUHING BASAHIN PARA SA SARILING KALIGTASAN

- Huwag gamitin ang produkto sa anumang kondisyon maliban sa itinakdang gamit nito. Kapag hindi sinunod ang mga babala, maaaring maging sanhi ito ng pagkakaroon ng electrical leakage, electrical shock, sunog, pag-apaw ng tubig at iba pang mga problema.
- Huwag gamitin ang produkto kapag may tao sa loob ng pool o balon. Maaaring maging sanhi ng electrical shock kapag nagkaroon ng electrical leakage.
- Huwag gamitin ang produkto sa anumang boltahe maliban sa itinakdang boltahe na nakalarawan sa nameplate na may voltage tolerance limit na nasa loob ng $\pm 5\%$. Kapag ginamitan ng generator, mahigpit na ipinapayo na iwasan ang paggamit ng ibang kagamitan sa parehong generator. Kapag hindi sinunod ang mga babala, maaaring masira o hindi gumana nang husto ang produkto, at maging sanhi ng pagkakaroon ng electrical leakage o electrical shock.
- Ang lahat ng gawain kaugnay sa elektrisidad (pati ang cable extension) ay kailangang gawin ng isang authorized electrician, sang-ayon sa mga naaangkop na regulasyon sa sariling bansa. Huwag itong ipagawa sa isang taong walang sapat na kuwalipikasyon sa paggawa ng electrical work, dahil hindi lamang ito labag sa batas kundi masyadong mapanganib.
- Kailangang maglaan ng isang dedicated earth leakage circuit breaker (na may rated sensitivity current na hindi lalampas sa 30 mA) at may thermal overload relay na nababagay sa pump (ibinibenta sa mga tindahan). Kapag hindi sinunod ang mga babala, maaaring maging sanhi ito ng pagkakaroon ng electrical shock o pagsabog sa kapag nagkaroon ng problema sa produkto o kapag nagkaroon ng electrical leakage.
- Gumawa ng isang secure grounding para lamang sa produkto. Huwag ikabit ang ground wire sa tubo ng gas o tubig, lightening rod, o telephone ground wire. Maaaring maging sanhi ng electrical shock ang hindi pagtatag ng tamang grounding.
- Huwag gumamit ng cable, power plug, or power outlet kapag ito ay sira na, o kapag hindi maayos ang pagkakakabit nito. Ang pagpalit ng cable ay kailangang gawin ng isang taong may sapat na kuwalipikasyon. Ikabit nang maigi ang bawat conductor ng cable sa mga terminals. Kapag hindi sinunod ang mga babala, maaaring maging sanhi ito ng pagkakaroon ng electrical shock, short circuit o sunog.
- Huwag ilubog sa tubig ang dulo ng cable o power plug. Maaari itong maging sanhi ng pagkasira ng produkto, pagkakaroon ng electrical leakage, electrical shock, o sunog.
- Huwag gasgasin, tupiin, hilahin, ibaluktot, baguhin o ibigkis ang cable o di kaya'y gamitin ito bilang isang lifting device. Maaaring masira ang cable, na maging sanhi ng pagkakaroon ng electrical leakage, short circuit, electrical shock, o sunog.
- Bago umpisahan ang maintenance o pagsusuri, kailangang patayin ang power supply o tanggalin ang plug upang maiwasan ang hindi sinasadyang pag-andar ng pump. Huwag gumawa kapag basa ang mga kamay. Kapag hindi sinunod ang mga babala, maaaring maging sanhi ito ng pagkakaroon ng electrical shock, o pagkapinsala.

تأكد من القراءة من أجل سلامتك

- لا تقم بتشغيل المنتج تحت أية ظروف بخلاف تلك المحددة له. قد يؤدي عدم مراعاة الاحتياطات إلى حدوث تسرب كهربائي أو صدمة كهربائية أو نشوب حريق أو فيضان الماء أو وقوع مشكلات أخرى.
- لا تحاول مطلقاً تشغيل المنتج عند وجود شخص ما في حمام السباحة أو في الحوض. إذا حدث تسرب كهربائي، فقد يتسبب في صدمة كهربائية.
- لا تقم بتشغيل المنتج تحت أي جهد بخلاف ما هو موضح على اللوحة، على أن يكون حد تحمل الجهد ضمن $\pm 5\%$. إذا تم تشغيله باستخدام مولد، يُنصح بشدة بعدم تشغيل معدات أخرى باستخدام نفس المولد. عدم مراعاة هذا التنبيه قد يؤدي إلى حدوث خلل للمنتج وتعطله، مما قد يؤدي بدوره إلى حدوث تسرب كهربائي أو صدمة كهربائية.
- يجب أن يقوم كهربائي معتمد بتنفيذ جميع الأعمال الكهربائية (هما في ذلك توصيل الكابلات)، وفقاً لجميع اللوائح المعمول بها في بلدك. لا تسمح أبداً لشخص غير معتمد بأداء الأعمال الكهربائية ليس فقط لكون ذلك مخالفاً للقانون، بل لأنه قد يشكل خطورة شديدة أيضاً.
- قم بتجهيز قاطع دائرة تسرب أرضي مخصص (به تيار حساسية مُقدَّر لا يتجاوز 30 مللي أمبير) ومرحل حراري يعمل عند تجاوز الحمل مناسب للمضخة (كلاهما متاح في السوق). قد يؤدي عدم اتباع هذا التحذير إلى حدوث صدمة كهربائية أو انفجار إذا فشل المنتج في أداء وظيفته أو إذا حدث تسرب كهربائي.
- قم بتوفير تأريض آمن مخصص للمنتج. لا تقم بتوصيل سلك التأريض بأنبوب غاز أو أنبوب ماء أو مانع صواعق أو سلك تأريض الهاتف التأريض بطريقة غير سليمة قد يسبب صدمة كهربائية.
- لا تستخدم الكابل أو قابس الطاقة أو مأخذ الطاقة إذا كان تالفاً أو إذا لم يكن مركباً بإحكام. يجب أن يتم استبدال الكابل التالف بواسطة شخص مؤهل. قم بتوصيل كل موصل من موصلات الكابل إلى الأطراف بشكل آمن. عدم مراعاة هذا قد يؤدي إلى حدوث صدمة كهربائية أو دائرة قصر أو نشوب حريق.
- لا تعتمد مطلقاً على غمر طرفي الكابل أو قابس الطاقة في الماء. قد يؤدي هذا إلى تلف المنتج أو حدوث تسرب كهربائي أو صدمة كهربائية أو نشوب حريق.
- لا تعتمد على خدش الكابل أو طيه أو سحبه أو ثنيه أو إجراء تعديلات عليه أو تجميعه، أو استخدامه كجهاز رفع. قد يكون الكابل تالفاً مما قد يتسبب في حدوث تسرب كهربائي أو دائرة قصر أو صدمة كهربائية أو نشوب حريق.
- قبل بدء الصيانة أو الفحص، قم بقطع تزويد الطاقة بالكامل أو قم بفصل القابس حتى لا يبدأ تشغيل المضخة بشكل غير مقصود. لا تقم بمباشرة العمل حين تكون يداك مبللتين. عدم مراعاة هذه التنبيهات قد يؤدي إلى حدوث صدمة كهربائية أو إصابة.

ASEGÚRESE DE LEER LA SIGUIENTE INFORMACIÓN PARA SU SEGURIDAD

- No manipule el producto en condiciones distintas a las que ha sido diseñado. El incumplimiento de esta precaución puede ocasionar fugas eléctricas, descargas eléctricas, incendios, desbordamientos de agua u otros problemas.
- Nunca intente manipular el producto si hay alguien presente en la pileta (piscina) o sumidero. Una fuga eléctrica puede ocasionar una descarga eléctrica.
- No manipule el producto en un voltaje diferente al indicado en la placa de identificación. Utilícelo dentro del rango de tolerancia de voltaje de $\pm 5\%$. Si se manipula con un generador, se recomienda encarecidamente no operar otros equipos con el mismo generador. El incumplimiento de esta precaución puede causar el mal funcionamiento y la falla del producto, lo que podría ocasionar fugas o descargas eléctricas.
- Todos los trabajos de electricidad (incluida la instalación del cable de extensión) deben ser realizados por un electricista autorizado, en conformidad con las regulaciones aplicables en su país. Nunca permita que una persona no autorizada realice trabajos eléctricos porque, no solo es ilegal, sino que puede ser extremadamente peligroso.
- Asegúrese de instalar un disyuntor específico de fuga a tierra (con sensibilidad nominal no superior a 30 mA) y un relé de sobrecarga térmica adecuado para la bomba (ambos disponibles en el mercado). El incumplimiento de esta advertencia puede ocasionar descargas eléctricas o explosiones cuando el producto falla o se produce una fuga eléctrica.
- Instale una conexión a tierra segura y específica para el producto. No conecte el cable de tierra a una tubería de gas, tubería de agua, pararrayos o cable de tierra del teléfono. Una conexión a tierra incorrecta podría causar descargas eléctricas.
- No utilice el cable, el enchufe o la toma de corriente si están dañados o si no están bien ajustados. Los cables dañados deben ser reemplazados por una persona calificada. Conecte cuidadosamente cada conductor del cable a los terminales. De lo contrario, se podrían producir descargas eléctricas, cortocircuitos o incendios.
- Nunca sumerja los extremos de un cable o el enchufe en agua. Esto podría ocasionar daños en el producto, fugas eléctricas, descargas eléctricas o incendios.
- No raye, doble, hale, tuerza, altere ni enrolle el cable, ni lo use como dispositivo de elevación. El cable podría dañarse, ocasionando fugas eléctricas, cortocircuitos, descargas eléctricas o incendios.
- Antes de comenzar el mantenimiento o la inspección, asegúrese de apagar la fuente de alimentación o desconectar el enchufe para que la bomba no arranque accidentalmente. No trabaje con las manos mojadas. El incumplimiento de estas precauciones podría ocasionar descargas eléctricas o lesiones.

ASSUREZ-VOUS DE LIRE CE DOCUMENT POUR VOTRE SÉCURITÉ

- N'utilisez pas le produit dans des conditions autres que celles pour lesquelles il est spécifié. Le non-respect de cette précaution peut entraîner une dispersion électrique, une électrocution, un incendie, une inondation ou d'autres problèmes.
- N'essayez jamais de faire fonctionner le produit si quelqu'un est présent dans la piscine ou le puisard. Si une dispersion électrique se produit, cela peut provoquer une électrocution.
- Ne faites pas fonctionner le produit sous une tension autre que celle indiquée sur la plaque signalétique dans une limite de tolérance inférieure à $\pm 5\%$. Si vous utilisez un groupe électrogène, il est fortement recommandé de ne pas utiliser d'autres équipements avec le même groupe électrogène. Le non-respect de cet avertissement peut provoquer un dysfonctionnement et une panne de l'appareil, pouvant entraîner une dispersion électrique ou une électrocution.
- Tous les travaux électriques (y compris l'extension des câbles) doivent être effectués par un électricien agréé, conformément à toutes les réglementations en vigueur dans votre pays. Ne permettez jamais à une personne non autorisée d'effectuer des travaux électriques, car non seulement c'est illégal, mais cela peut aussi être extrêmement dangereux.
- Prévoir absolument un disjoncteur différentiel dédié (avec une sensibilité nominale ne dépassant pas 30 mA) et un relais thermique de surcharge adapté à la pompe (tous deux disponibles dans le commerce). Le non-respect de cet avertissement peut provoquer une électrocution ou une explosion en cas de défaillance du produit ou de dispersion électrique.
- Fournir une mise à la terre sécurisée dédiée au produit. Ne branchez pas le fil de terre à une conduite de gaz ou d'eau, à un paratonnerre ou à un fil de terre de téléphone. Une mise à la terre incorrecte peut provoquer une électrocution.
- N'utilisez pas le câble, la fiche d'alimentation ou la prise de courant s'ils sont endommagés ou s'ils ne sont pas bien fixés. Tout câble endommagé doit être remplacé par une personne qualifiée. Raccordez solidement chaque conducteur du câble aux bornes. Le non-respect de cette consigne peut entraîner une électrocution, un court-circuit ou un incendie.
- Ne jamais immerger les extrémités d'un câble ou la fiche d'alimentation dans l'eau. Cela pourrait endommager l'appareil, provoquer une dispersion électrique, une électrocution ou un incendie.
- Ne pas érafler, plier, tirer, tordre, modifier, mettre en faisceau le câble ou l'utiliser comme dispositif de levage. Le câble peut être endommagé, ce qui peut provoquer une dispersion électrique, un court-circuit, une électrocution ou un incendie.
- Avant de commencer l'entretien ou l'inspection, coupez impérativement l'alimentation électrique ou débranchez la prise afin que la pompe ne puisse pas démarrer accidentellement. Ne travaillez pas avec les mains mouillées. Le non-respect de ces mises en garde peut entraîner une électrocution ou des blessures.

ОБЯЗАТЕЛЬНО ПРОЧИТАЙТЕ ДЛЯ ВАШЕЙ СОБСТВЕННОЙ БЕЗОПАСНОСТИ

- Не пользуйтесь изделием в условиях, отличных от тех, для которых оно предназначено. Несоблюдение данных мер предосторожности может привести к утечке тока, поражению электрическим током, пожару, переливу воды или другим проблемам.
- Никогда не пытайтесь использовать изделие, если кто-либо присутствует в бассейне или сточном колодце. Утечка тока может привести к поражению электрическим током.
- Не используйте изделие под напряжением, отличным от указанного на заводской табличке, при допустимом отклонении напряжения в пределах $\pm 5\%$. Если он работает с генератором, настоятельно рекомендуется не использовать другое оборудование с тем же генератором. Несоблюдение данной меры предосторожности может стать причиной неисправности и повреждения изделия, что может привести к утечке или поражению электрическим током.
- Все электромонтажные работы (включая удлинение кабеля) должны выполняться уполномоченным электриком в соответствии со всеми действующими правилами вашей страны. Никогда не позволяйте посторонним лицам выполнять электромонтажные работы, поскольку это не только противоречит закону, но и может быть чрезвычайно опасным.
- Чрезвычайно необходимо предоставить специальный автоматический выключатель для защиты от утечки на землю (имеющий номинальную чувствительность тока не более 30 мА) и тепловое реле перегрузки, подходящее для насоса (оба доступны в продаже). Несоблюдение этого предупреждения может привести к поражению электрическим током или взрыву в случае выхода из строя изделия либо утечки тока.
- Обеспечьте безопасное заземление, предназначенное для изделия. Не подключайте заземляющий провод к газовой трубе, водопроводу, молниеотводу или телефонному заземляющему проводу. Ненадлежащее заземление может привести к поражению электрическим током.
- Не используйте кабель, вилку или розетку, если они повреждены или не плотно прилегают. Поврежденный кабель должен быть заменен квалифицированным персоналом. Надежно подключите каждую жилу кабеля к клеммам. Несоблюдение этого требования может привести к поражению электрическим током, короткому замыканию или возгоранию.
- Никогда не погружайте концы кабеля или вилку в воду. Это может привести к повреждению изделия, утечке тока, поражению электрическим током или пожару.
- Не царапайте, не складывайте, не тяните, не скручивайте, не вносите изменения, не связывайте кабель и не используйте его в качестве подъемного устройства. Кабель может быть поврежден, что может привести к утечке тока, короткому замыканию, поражению электрическим током или пожару.
- Перед началом технического обслуживания или проверки обязательно отключите электропитание или отсоедините штепсельную вилку таким образом, чтобы насос случайно не запустился. Не производите работу мокрыми руками. Несоблюдение данных мер предосторожности может привести к поражению электрическим током или травме.

1 BE SURE TO READ FOR YOUR SAFETY

Be sure to thoroughly read and understand the SAFETY PRECAUTIONS given in this section before using the equipment in order to operate the equipment correctly.

The precautionary measures described in this section are intended to prevent danger or damage to you or to others. The contents of this manual that could possibly be performed improperly are classified into two categories: **⚠ WARNING**, and **⚠ CAUTION**. The categories indicate the extent of possible damage or the urgency of the precaution. Note however, that what is included under **⚠ CAUTION** may at times lead to a more serious problem. In either case, the categories pertain to safety-related items, and as such, must be observed carefully.

- **⚠ WARNING** : Operating the equipment improperly by failing to observe this precaution may possibly lead to death or injury to humans.
- **⚠ CAUTION** : Operating the equipment improperly by failing to observe this precaution may possibly cause injury to humans and other physical damage.
- **NOTE** : Gives information that does not fall in the WARNING or CAUTION categories.
- **Explanation of Symbols:**



: The △ mark indicates a WARNING or CAUTION item. The symbol inside the mark describes the precaution in more detail ("electrical shock", in the case of the example on the left).



: The ⊘ mark indicates a prohibited action. The symbol inside the mark, or a notation in the vicinity of the mark describes the precaution in more detail ("disassembly prohibited", in the case of the example on the left).



: The ● mark indicates an action that must be taken, or instructs how to perform a task. The symbol inside the mark describes the precaution in more detail ("provide ground work", in the case of the example on the left).

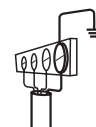
PRECAUTIONS TO THE PRODUCT SPECIFICATIONS

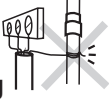
⚠ CAUTION	
	● Do not operate the product under any conditions other than those for which it is specified. Failure to observe the precaution can lead to electrical leakage, electrical shock, fire, water overflow or other problems.



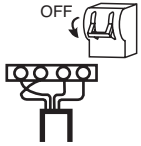
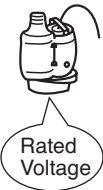
PRECAUTIONS DURING TRANSPORT AND INSTALLATION

⚠ WARNING			
	● When transporting the product, pay close attention to its center of gravity and mass. Use an appropriate lifting equipment to lift the unit. Improper lifting may result in the fall of the product which could cause damage of the product or human injury.		
	● Electrical wiring should be performed in accordance with all applicable regulations in your country. Absolutely provide a dedicated earth leakage circuit breaker and a thermal overload relay suitable for the product (available on the market). Imperfect wiring or improper protective equipment can lead to electrical leakage, fire, or explosion in the worst case.		
			● Install the product properly in accordance with this instruction manual. Improper installation may result in electrical leakage, electrical shock, fire, water leakage, or injury.
			● Provide a secure grounding dedicated for the product. Never fail to provide an earth leakage circuit breaker and a thermal overload relay in your starter or control panel (Both available on the market). If an electrical leakage occurs due to a product failure, it may cause electrical shock.



⚠ CAUTION	
 Be sure to provide a ground wire securely. Do not connect the ground wire to a gas pipe, water pipe, lightning rod, or telephone ground wire. Improper grounding could cause electrical shock. 	 Attach a hose securely to the hose coupling. Imperfect connection of hose could cause water leakage which may result in the damage of nearby walls, floors, and other equipment. 
 Do not scratch, fold, twist, make alterations, or bundle the cable, or use it as a lifting device. The cable may be damaged, which may cause electrical leakage, short-circuit, electrical shock, or fire. 	 Do not use the cable if it is damaged. Connect every conductor of the cable securely to the terminals. Failure to observe this can lead to electrical shock, short-circuit, or fire. 
 When the product will be carried by hand, decide the number of persons considering the mass of the product. When lifting up the product, do not attempt to do it by simply bowing from the waist. Use the knees, too, to protect your back. 	 Use the handle when installing or carrying the pump. Never use the cable to carry or to suspend. Doing so may damage the cable which could cause electrical leakage, short circuit, or fire. 
 This pump is neither dust-proof nor explosion-proof. Do not use it at a dusty place or at a place where toxic, corrosive or explosive gas is present. Use in such places could cause fire or explosion. 	 Allow the pump to suck as few foreign objects as possible. If there is a risk that the pump could be buried under the sediment, place it on a solid base like concrete block. Failure to do so may result in breakdown of the pump and could cause electrical leakage or short circuit. 
 If a hose is used for the discharge line, take a measure to prevent the hose from shaking. If the hose shakes, you may be wet or injured. 	

PRECAUTIONS DURING TEST OPERATION AND OPERATION

⚠ WARNING	
 Never try to operate the pump if somebody is present in the pump sump. If an electrical leakage occurs, it can cause electrical shock. 	 When changing power connection is needed to correct the direction of rotation, be sure to turn off the power supply (earth leakage circuit breaker, etc.), and perform the work after making sure that the impeller has stopped completely. Failure to do so may lead to electrical shock, short-circuit, or injury. 
 Never start the pump while it is suspended, as the unit may jerk and could lead to injury. 	
⚠ CAUTION	
 Do not operate the product under any voltage other than described on the nameplate with the voltage tolerance limit within $\pm 5\%$. If it is operated with a generator, it is strongly suggested not to operate other equipment with the same generator. Failure to observe this caution may cause malfunction and breakdown of the product, which may lead to electrical leakage or electrical shock. 	 Do not touch the product with bare hands during or immediately after the operation, as the product may become very hot during operation. Failure to observe this caution may lead to burn. 
 Do not use the product in a liquid other than water. Use in oil, salt water or organic solvents will damage it, which may lead to electrical leakage or electrical shock. 	 Do not run the product dry or operate it with its gate valve closed, as doing so will damage the product, which may lead to electrical leakage or electrical shock. 

⚠ CAUTION		
	Do not use the product for hot or warm liquid over 40°C, as doing so will damage the product, which may lead to electrical leakage or electrical shock.	
	Do not allow foreign object (pin, wire, etc.) to enter the suction inlet of the pump. Failure to observe this caution could cause it to malfunction or to operate abnormally, which may lead to electrical leakage or electrical shock.	 
		When the product will not be used for an extended period, be sure to turn off the power supply (earth leakage circuit breaker, etc.). Deterioration of the insulation may lead to electrical leakage, electrical shock, or fire.  

PRECAUTIONS DURING MAINTENANCE AND INSPECTION

⚠ WARNING		
	Absolutely turn off the power supply or disconnect the plug before starting maintenance or inspection. Do not work with wet hands. Failure to observe these cautions may lead to electrical shock or injury.	 
	In case any abnormality (excessive vibration, unusual noise or odor) is found in the operation, turn the power off immediately and consult with the dealer where it was purchased or Tsurumi representative. Continuing to operate the product under abnormal conditions may result in electrical shock, fire, or water leakage.	  
		Do not disassemble or repair any parts other than those designated in the operation manual. If repairs are necessary in any other than the designated parts, consult with the dealer where it was purchased or Tsurumi representative. Improper repairs can result in electrical leakage, electrical shock, fire, or water leakage. 
⚠ CAUTION		
	After reassembly, always perform a test operation before resuming use of the product. Improper assembly can result in electrical leakage, electrical shock, fire, or water leakage.	

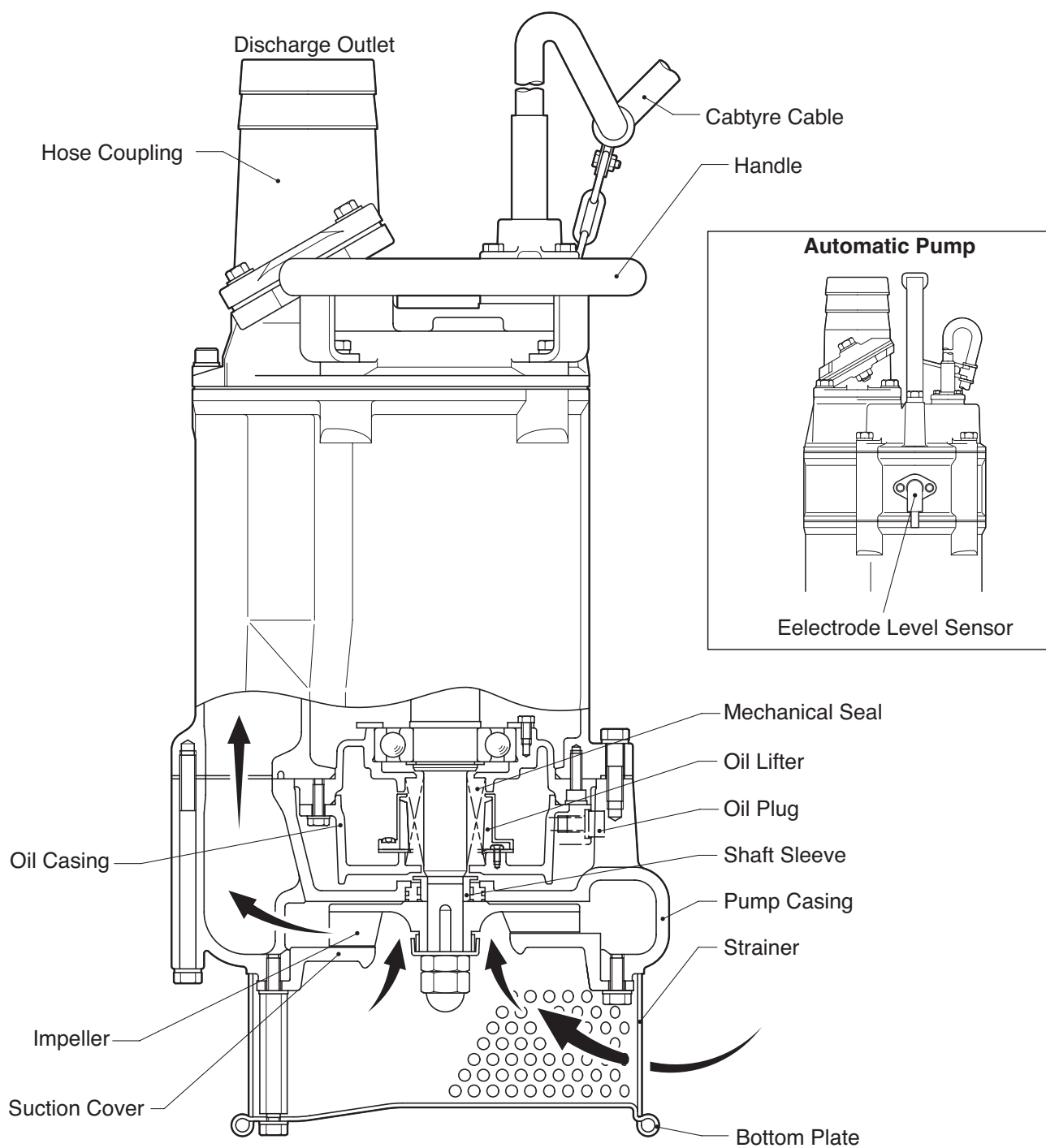
PRECAUTION TO POWER OUTAGE

⚠ WARNING		
	In case of power outage, turn off the power supply. The product will resume operation when the power is restored, which presents serious danger to people in the vicinity.	 

OTHER PRECAUTION

⚠ CAUTION		
	Never use the product for potable water. It may present a danger to human health.	 
⚠ CAUTION		
	- This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety. - Children should be supervised to ensure that they do not play with the appliance. - If the supply cord is damaged, it must be replaced by the manufacturer, its service agent or similarly qualified persons in order to avoid a hazard. - Pollution of the liquid could occur due to leakage of lubricants. - The pump must be supplied through a residual current device (RCD) having a rated residual operating current not exceeding 30 mA.	

2 PUMP PART NAMES



Note: *This diagram shows the part layout of a typical KTZ model. The external appearance and the internal construction may vary slightly, depending on your particular model.*

3 PRIOR TO OPERATION

Check the following points after receiving the pump:

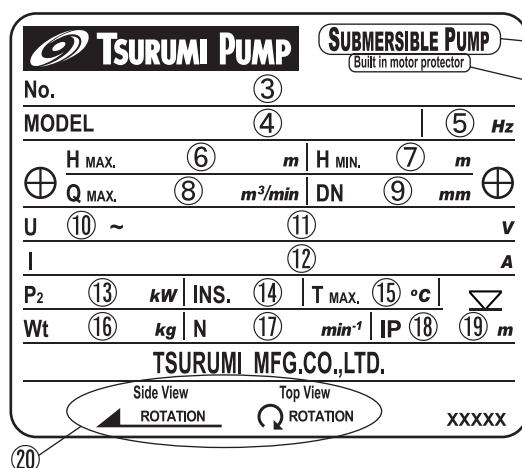
Inspection

Unpack the package and verify that no damage has occurred during shipment and that the bolts and nuts have not loosened.

Specification Check

Check the nameplate of the pump unit to verify that it is the product that you have ordered. Pay particular attention to its voltage and frequency specifications.

Example of nameplate



1	Submersible pump	11	Rated voltage
2	Built in motor protector	12	Rated current
3	Serial number	13	Rated output power
4	Model	14	Insulation class
5	Frequency	15	Max. liquid temperature
6	Max. total head	16	Weight without cable
7	Min. total head	17	Speed of rotation
8	Max. flow rate	18	IP degree of protection
9	Discharge bore	19	Max. immersion depth
10	Phase	20	Direction of rotation

Note: If you discover any damage or discrepancy, please contact with the Tsurumi dealer from whom you purchased the product or the nearest Tsurumi representative office.

Accessory Check

Verify that all accessory items, are include in the package.

Operation Manual..... 1

Note: If you discover any damage or discrepancy in the product, please contact the dealer where this equipment was purchased or the Tsurumi sales office in your area.

Product Specifications



CAUTION

Do not use the product under conditions other than those specified. Doing so may lead to short, electrical shock, or fire, or might inhibit the product from attaining its full potential.

Main Components Specifications

Fluid	Property	Work drainage and sand carrying / 0 to 40°C
Pump	Impeller	Semi-open
	Shaft Seal	Double mechanical seal
	Bearing	Shielded ball bearing (Model with output 15kW or less) ball bearing(22kW)
Motor	Type , Poles	Dry type submersible induction motor, 2 poles
	Insulation	Class F
	Motor Protector (built-in)	Circle thermal protector(Model with output 15kW or less)
		Miniature Protector(22kW)
	Lubricant	Turbine oil VG 32 (non-additive)
Discharge Connection		Hose coupling

■ Specifications - Non-Automatic Pumps (50/60Hz)

Discharge Bore (mm)	Model	Motor Output (kW)	Max. Total Head (m)	Max. Flow Rate (m³/min)	Starting Method	Dry Weight (kg)
50	KTZ21.5	1.5	21.5 / 23.0	0.43 / 0.40	Direct-on-Line	34
50	KTZ22.2	2.2	26.0 / 30.5	0.50	Direct-on-Line	35
50	KTZ23.7	3.7	36.5 / 35.0	0.45 / 0.54	Direct-on-Line	60
80	KTZ31.5	1.5	14.4	0.67 / 0.68	Direct-on-Line	33
80	KTZ32.2	2.2	20.4	0.80 / 0.77	Direct-on-Line	34
80	KTZ33.7	3.7	29.0 / 31.0	0.90 / 0.83	Direct-on-Line	60
80	KTZ35.5	5.5	32.0 / 38.0	1.10 / 0.99	Direct-on-Line	74
100	KTZ43.7	3.7	18.0 / 18.6	1.44 / 1.46	Direct-on-Line	60
100	KTZ45.5	5.5	22.5 / 24.0	1.74 / 1.62	Direct-on-Line	74
100	KTZ47.5	7.5	40.0 / 42.0	1.40 / 1.32	Direct-on-Line	101
100	KTZ411	11	48.5 / 51.0	1.44 / 1.43	Direct-on-Line	133
100	KTZ415	15	55 / 57	1.98 / 1.87	Direct-on-Line	146
100	KTZ422	22	71 / 72.5	2.75 / 2.4	Direct-on-Line	295 / 294
150	KTZ67.5	7.5	31.0	2.03 / 2.08	Direct-on-Line	100
150	KTZ611	11	32.5	2.44	Direct-on-Line	133
150	KTZ615	15	39.5	2.8 / 2.7	Direct-on-Line	147
150	KTZ622	22	55 / 56	4.0 / 3.8	Direct-on-Line	296 / 295

Note: The weight (mass) given above is the operating weight of the pump itself, not including the cabutryre cable.

■ Specifications - Automatic Pumps (50/60Hz)

Discharge Bore (mm)	Model	Motor Output (kW)	Max. Total Head (m)	Max. Flow Rate (m³/min)	Starting Method	Dry Weight (kg)
50	KTZE21.5	1.5	21.5 / 23.0	0.43 / 0.40	Direct-on-Line	39
50	KTZE22.2	2.2	26.0 / 30.5	0.50	Direct-on-Line	41
50	KTZE23.7	3.7	36.5 / 35.0	0.45 / 0.54	Direct-on-Line	69
80	KTZE31.5	1.5	14.4	0.67 / 0.68	Direct-on-Line	38
80	KTZE32.2	2.2	20.4	0.80 / 0.77	Direct-on-Line	40
80	KTZE33.7	3.7	29.0 / 31.0	0.90 / 0.83	Direct-on-Line	69
100	KTZE43.7	3.7	18.0 / 18.6	1.44 / 1.46	Direct-on-Line	69

Note: The weight (mass) given above is the operating weight of the pump itself, not including the cabutryre cable.

4 INSTALLATION



CAUTION

- The supply voltage tolerance within $\pm 5\%$ of the rated voltage.
- To use the pump, the water temperature should be between 0°C and 40°C.
- The pump should be used only for pumping plain water. The pump should not be used to pump fluids such as oil, salt water, or organic solvents.
- The pump must never be used to pump explosive liquids and should never be operated in an area from whom explosive elements might be present.
- The pump must not be used in a partially disassembled state.

Note: When using the pump for a special solution, please consult the dealer from whom you purchased the equipment, or the Tsurumi sales office in your area.

■ Critical Pressure



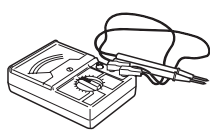
CAUTION

Do not use the pump in an area where the water pressure exceeds the values given below, as it may damage the pump, or cause a short or electrical shock.

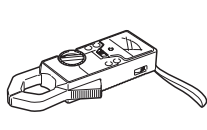
Model	Critical Pressure
KTZ(E)21.5 KTZ(E)31.5 KTZ(E)22.2 KTZ(E)32.2 KTZ(E)23.7 KTZ(E)33.7 KTZ(E)43.7 KTZ35.5 KTZ45.5	0.5MPa (5kgf/cm ²) — discharge pressure during use
KTZ47.5 KTZ67.5 KTZ411 KTZ611 KTZ415 KTZ615 KTZ422 KTZ622	0.5MPa (5kgf/cm ²)

■ Preparation for Installation

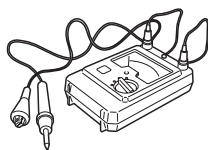
Listed below are tools and instruments that are needed to install the submersible pump for general dewatering purpose.



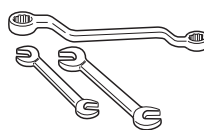
AC voltmeter
(tester)



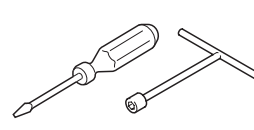
AC ammeter
(clamp)



Insulation resistance
tester
(megger tester)



Wrenches for
fastening
bolts and nuts



Wrenches for connecting
the power supply
(a screwdriver or a box wrench)

Note: Consult the operation manual provided with each tester for the proper use of the tester.

■ Pre-Installation Check

Using a megger tester, measure the resistance between each of the core wires and the ground wire (green or green/yellow) to verify the insulation resistance of the motor.

■ Insulation resistance reference value = 20MΩ min.

Note: The insulation reference value of 20MΩ min. is based on a new or repaired pump. For reference values of a pump that has already been installed, refer to "7. Maintenance and Inspection" on page 17 of this manual.

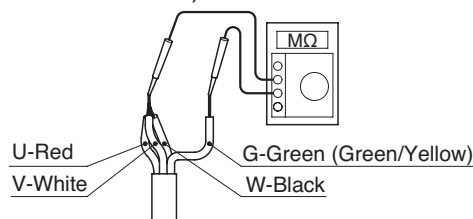
■ Automatic Pumps

Bundle each core of the cabtyre cable (Red, White and Black, or Brown, Grey and Black), then measure and check the insulation resistance between the ground wire (Green or Green/Yellow) with an insulation resistance tester.

Note: In case of measuring between each core of the cabtyre cable and ground wire, it may not measure correctly because of the characteristic.

■ Insulation resistance reference value = 20MΩ or more

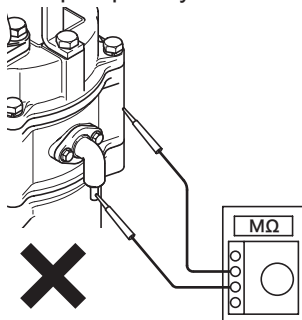
Note: The insulation reference value of 20MΩ min. is based on a new or repaired pump. For reference values of a pump that has already been installed, refer to "7. Maintenance and Inspection" on page 17 of this manual.



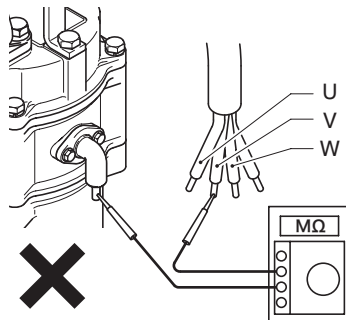
CAUTION

Do not measure the insulation resistance with an insulation resistance tester for following parts. It may cause control circuit troubles.

- (1) Between the electrode and the pump body

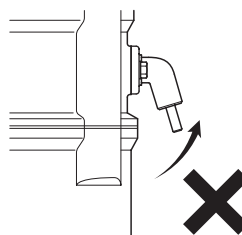


- (2) Between the electrode and each lead wire



CAUTION

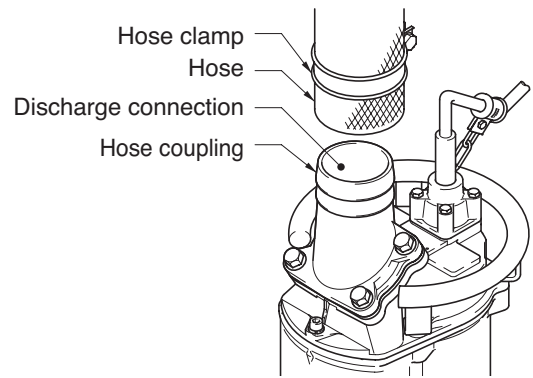
Do not lift or suspend by the electrode level sensor. It may cause current leakage, electrical shock or fire.



Precautions During Installation

- (1) Push the hose all the way to the base of the hose coupling. Tighten the hose clamp to secure the hose in place.

Note: *A hose coupling designed for use with a suction hose is available separately. The hose coupling should be used when using a suction hose as the delivery hose. However, the existing coupling may be used on the 11/15/22kW models.*



WARNING

When installing the pump, be mindful of the pump's center of gravity and weight. If the pump is not suspended properly, the pump may fall and break, which may lead to injury.

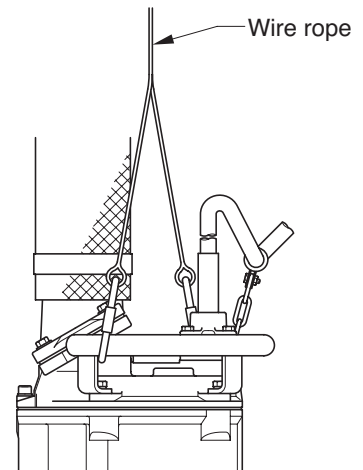


CAUTION

- When installing or moving the pump, do not suspend the pump by the cabtyre cable. Doing so will damage the cable, which may cause a short, electrical shock, or fire.
- When transporting the pump manually, be sure to have a sufficient number of people to carry out the task. To prevent back injury when lifting, bend your knees without bending your back.

- (2) Handle the pump carefully. Do not drop it or expose it to strong impacts. When suspending the pump to raise or to lower it, attach a wire rope or a chain to the pump's handle.

Note: *For proper procedures for handling the cabtyre cable, refer to "5. Electrical Wiring" on page 11 of this manual.*



CAUTION

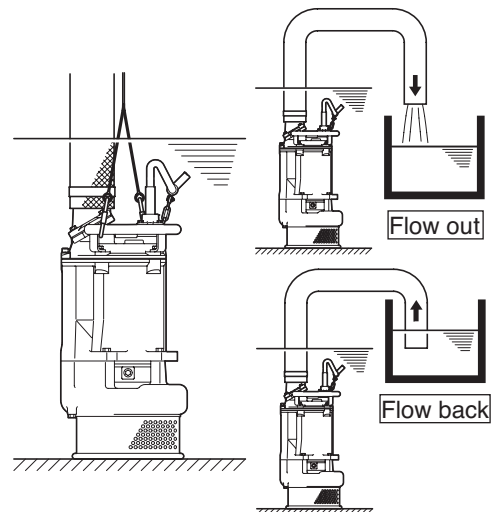
- Do not operate the pump dry. Doing so will prevent the pump from attaining its full potential and may also damage the pump and lead to a short and electrical shock.
- In order to properly discharge water, provide adequate piping to the area where the pump is mounted. Improper piping may lead to water leakage or other malfunctions.

- (3) Install the pump only in an area that can maintain a proper water level.

Note: *For details on the water level necessary for pump operation, refer to the section on "Water Level During Operation" on page 14 of this manual.*

- (4) When using a hose to provide piping to the pump, observe the following:

Use the shortest possible length of discharge hose and minimize the number of bends. Verify that the end of the hose (discharge side) is lifted above the water surface. If the end of the hose is submerged in water, it may cause the water to flow back when the pump has been stopped. If the end of the hose is located at a level that is lower than that of the source water surface, water may continue to flow out even after the pump has been stopped.



Note: *Appropriate piping materials must be provided by the user.
Piping materials are not included with the product.*



CAUTION

If an excessive amount of sediment is drawn into the pump, it may cause the pump to wear, which can lead to current leakage or electrical shock.

- (5) The pump must be placed upright during operation. If there is a risk that the pump could be buried under the sediment, place the pump on a base made up of materials such as concrete blocks.



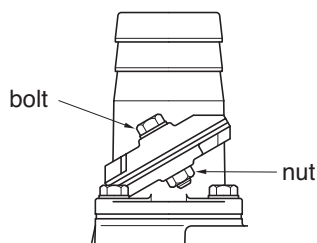
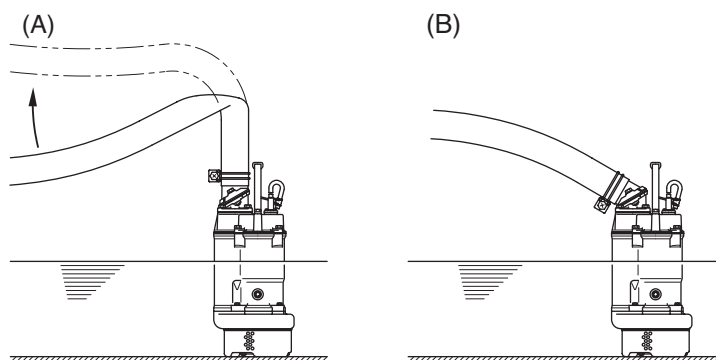
CAUTION

Pay attention that the electrode level sensor shall not be splashed. It may cause a malfunction.

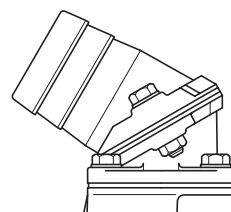
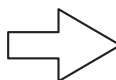
Changing the mounting direction of the hose coupling

Route the hose as straight as possible. Excessive bending of the hose could obstruct the flow of water, reduce the pumping volume, or clog the pump with mud, thus disabling the pumping abrasion. If the hose is kinked at its base, it will create air pockets in the pump, causing the pump to operate dry. To prevent this from occurring, straighten the bend while operating the pump.

If the hose becomes kinked as shown in (A), reposition the hose coupling so that it faces as shown in (B).



Remove the bolts and the nuts on the hose coupling.



After changing the mounting direction of the hose coupling, fasten the bolts and the nuts.

5 ELECTRICAL WIRING

Electrical Wiring Work



WARNING

- All electrical work must be performed by an authorized electrician, in compliance with local electrical equipment standards and internal wiring codes. Never allow an unauthorized person to perform electrical work because it is not only against the law, but it can also be extremely dangerous.
- Improper wiring can lead to current leakage, electrical shock, or fire.
- Absolutely provide a dedicated earth leakage circuit breaker and a thermal overload relay suitable for the pump (available on the market). Failure to follow this warning can cause electrical shock or explosion when the product fails or an electrical leakage occurs.

Be sure that the power supply and wiring have adequate capacity.

Grounding



WARNING

To prevent damaging the pump and causing current leakage, which may lead to electrical shock, be sure to install the ground wire securely.



CAUTION

To prevent electrical shock caused by improper grounding, do not connect the ground wire to a gas pipe, water pipe, lightning rod, or telephone ground wire.

Connecting the Cabtyre Cable



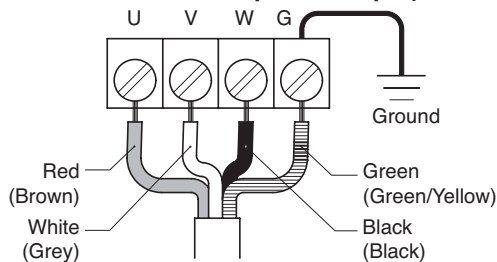
WARNING

Before connecting the cabtyre cable to the terminal board, make sure that the power supply (i.e. circuit breaker) is properly disconnected. Failure to do so may lead to electrical shock, short, or injury caused by the unintended starting of the pump.

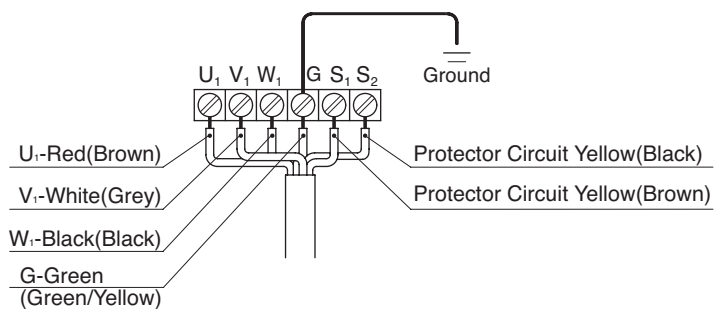
(1) Tighten the ends of the cabtyre cable securely against the terminal board.

(2) The figure on the right shows how to connect the cabtyre cable properly.

Direct-on-line starting
(models with 1.5 ~ 15kW power output)

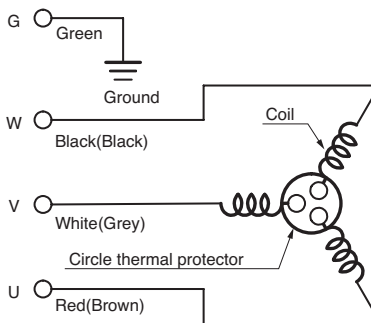


Direct-on-line starting
(models with 22kW power output)

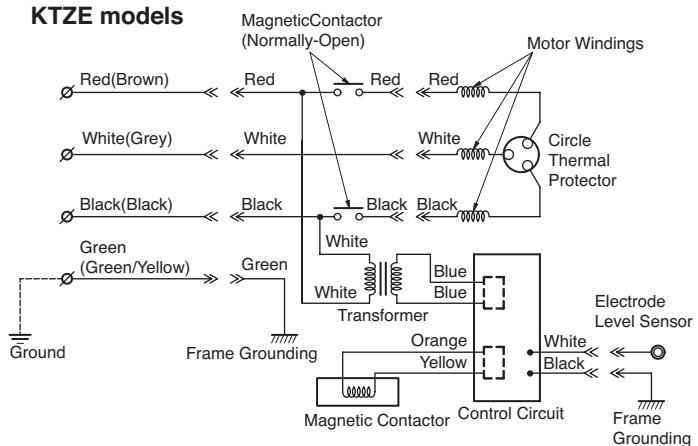


Wiring Diagram

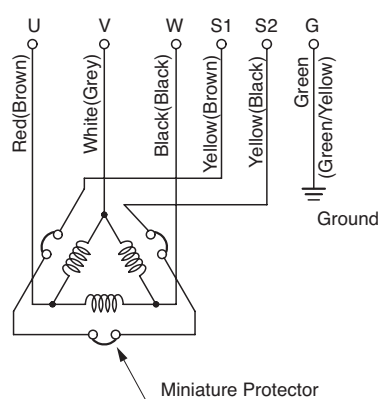
KTZ models
(models with 1.5~15kW power output)



KTZE models



KTZ models
(models with 22kW power output)



6 OPERATION

Before Operation

CAUTION Improper voltage and frequency of the power supply will prevent the pump from attaining its full potential, and may also lead to current leakage, electrical shock, or fire.

- (1) Once again, check the nameplate of the pump to verify that its voltage and frequency are correct.
- (2) Check the wiring, power supply voltage, the capacity of the ground leakage circuit breaker, and the insulation resistance of the motor.

■ Insulation resistance reference value = 20MΩ min.

Note: The insulation reference value of 20MΩ min. is based on a new or repaired pump. For reference values for a pump that has already been installed, refer to "7.Maintenance and Inspection" on page 17 of this manual.

- (3) Adjust the setting of the overflow protector (i.e. circuit breaker) to the pump's rated current.

Note: Verify the rated current on the pump's nameplate.

- (4) When using a generator, as much as possible avoid operating the pump in conjunction with other types of equipment.

Trial Operation

WARNING

- Never start the pump while it is suspended, as the pump may jerk and cause a serious accident involving injury.
- Never start the pump where people are present, as they may suffer electrical shock from current leakage.

CAUTION Be sure to check the pump's direction of rotation when the pump is exposed to atmosphere. Operating the pump in reverse while it is submerged in water will damage the pump, which may lead to current leakage, electrical shock, or fire.

- (1) Operate the pump for a short time (1 to 2 seconds), and then use a phase rotation indicator to check the rotational direction of the impeller.

Note: When using a phase rotation indicator, read the operation manual that is provided with it.

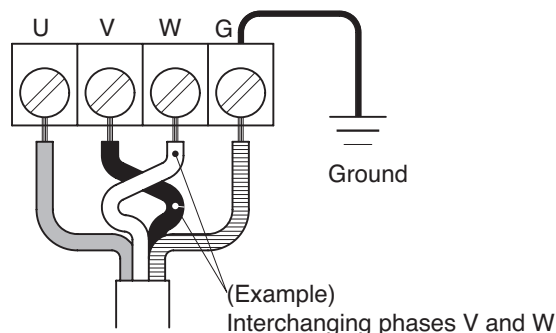
WARNING Before changing the connections for reverse rotation, make sure that the power supply (i.e. circuit breaker) is properly disconnected and that the impeller has stopped completely. Failure to observe this may lead to serious accidents, including electrical shock, short, or injury.

■ To reverse the rotation, the following countermeasure must be taken.

COUNTERMEASURE

Interchange two of the three wires designated U, V, and W, respectively.

Direct-on-line starting



(2) Operate the pump for a short time (3 to 10 minutes) and perform the following checks:

■ **Operating current**

Using an AC ammeter (clamp), measure the current at the phases U, V, and W that are connected to the terminal board.

COUNTERMEASURE

Because an overload condition may be present at the motor if the operating current exceeds the rated current, refer to the section "4. Installation" on page 7 of this manual for procedures on reverting the motor to the correct state.

■ **Operating voltage**

Use an AC voltmeter (tester) to measure the voltage at the terminal board.

■ Power supply voltage tolerance = within $\pm 5\%$ of the rated voltage

COUNTERMEASURE

If the power supply voltage deviates from the variation value, the deviation may be caused by the capacity of the power supply or the extension cable that is used. Refer to the section "5. Electrical Wiring" on page 11 of this manual to provide correct voltage.

■ **Vibration**



CAUTION

If the pump generates a considerable amount of vibration, noise, or smell, disconnect the power supply immediately and contact the dealer where you purchased the equipment, or the Tsurumi sales office in your area.

Continue operation if no abnormal conditions are found during the trial operation.

■ **Operation**



CAUTION

- The pump may be extremely hot during operation. To prevent burns, do not touch the pump with bare hands.
- Do not insert your finger or a stick into the pump's inlet opening. Doing so may cause injury, electrical shock, short, or fire.
- When the pump is not used for a long time, make sure that the power supply (such as a breaker) is properly disconnected. If the wiring insulation deteriorates with the power supply connected, it may cause current leakage, electrical shock, or fire.

Pay attention to the water level during the pump operation. The pump will become damaged if it is allowed to operate dry.

Note: Refer to the section "Water Level During Operation" on page 14 of this manual.

The pump is equipped with an internal motor protective device (circle thermal protector).

Motor protection system



WARNING

- During inspection and repair, disconnect the power supply to avoid starting the pump unintentionally. Failure to disconnect the power supply may lead to serious accidents including electrical shock, short, and injury.
- During a power outage, disconnect the power supply to the pump. Unintentional operation of the pump after power resumption would be extremely dangerous to people around the pump.



CAUTION

- Unless the cause of a problem is removed, the pump will repeat the stop-and-go cycle, eventually resulting in damage to the pump, and causing current leakage and electrical shock. Therefore, after verifying that the power supply is disconnected, find and correct the cause of the problem through inspection and repair.
- Do not operate the pump at unusually low head, or when the strainer is clogged with debris. Doing so will prevent the pump from attaining its full potential, and may also generate abnormal noise and vibration and cause damage to the pump, which may lead to current leakage, electrical shock, and fire.

1.Circle Thermal Protector

If a current overload or overheating occurs under the symptoms given below, the motor will stop automatically to protect the motor regardless of the water level at the time of operation.

In this type of motor protector, the motor will automatically restart after cooling down. If the motor is stopped by protector tripping, turn off the power supply first, and disconnect the cables from the power terminals. After this, make sure to eliminate the cause of the problem, such as the following:

- Extreme fluctuation of power supply voltage
- Pump operated under overload condition
- Pump operated at open phase or binding condition



WARNING

If repair or maintenance is attempted with cables connected to power supply, unintended automatic restarting of the motor may cause human injury.

2. Miniature Protector

This protector is embedded inside the motor coil. If the coil should overheat for any reason, bending of the bimetal of the miniature protector triggers a signal, which in turn causes a dedicated circuit in the starting console or control panel to be furnished by the user to shut off the motor current. When the temperature returns to normal, the protector is automatically reset, but restarting is controlled from the starting console or control panel.

Note: A b-contact miniature protector is adopted, which is normally "closed" and goes to "open" upon overheating. To protect the motor from current surges, be sure to install a motor breaker thermal relay or similar device in the external starting console or control panel. A 3E relay is able to protect the motor from overload, open-phase or reverse-phase operation.

Water Level During Operation

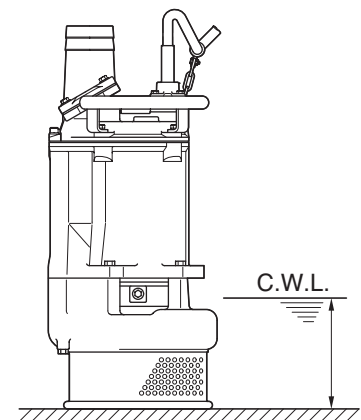


CAUTION

Do not operate the pump below Continuous running Water Level (C.W.L.), as doing so will damage the pump, causing current leakage and electrical shock.

The table below shows the water level during operation by output. Make sure that the water level will not be under these levels.

Model			C.W.L.
KTZ21.5	KTZ31.5		120mm
KTZ22.2	KTZ32.2		
KTZ23.7	KTZ33.7	KTZ43.7	150mm
KTZ35.5	KTZ45.5		
KTZ47.5	KTZ67.5		190mm
KTZ411	KTZ611		
KTZ415	KTZ615		
KTZ422	KTZ622		330mm



In the Case of Automatic Pumps

Starting of a pump

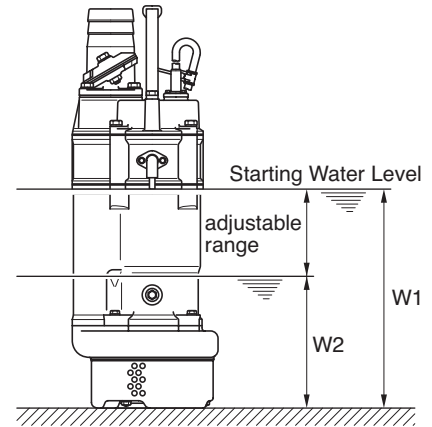
The pump starts when the current (micro current) continuously flows between a conductive part (Shaft, Bolt, etc.) and the electrode level sensor for more than one (1) second.

Note: *The electrode may not detect the water surface under conditions such as purified water or distilled water with which the current does not flow because of high specific resistance.*

Starting Water Level

The water level is decided by the distance between the tip of the electrode level sensor and the sump bottom. If you want to set the starting water level lower, please set as following instruction.

- (1) Fit an extension electrode (optional accessory) to the Electrode Level Sensor of the pump. (The extension electrode is available as an optional accessory.)
- (2) The water level is the distance between the sump bottom and the end.
- (3) Please adjust the water level to the lowest starting level or upper.

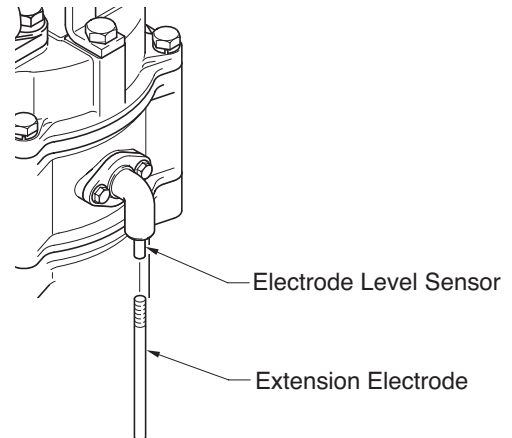


Note: • If you set the water level lower than the lowest starting level, it may not operate correctly because of an air lock and so on.

• Extension Electrode should not touch the pump body.

• In case of starting the unit under non-submerged condition during a trial operation, please short-circuit for more than one (1) second the electrode and the conductive part (bolt, etc.) with a conductive item (lead wire, etc.), and start forcibly.

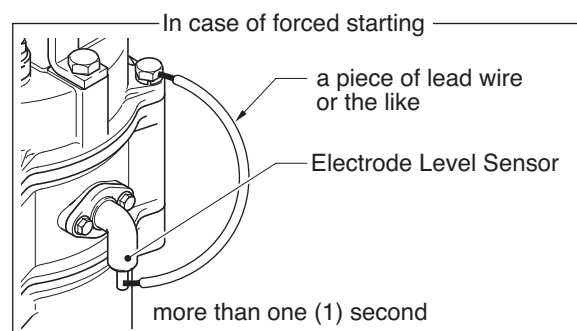
• You will not get an electric shock if the electrode touches the human body during power on, however it may cause a wrong operation.



Unit : mm		
Pump Model	W1	W2
KTZE21.5/31.5	345	255
KTZE22.2/32.2	355	265
KTZE23.7/33.7/43.7	435	345

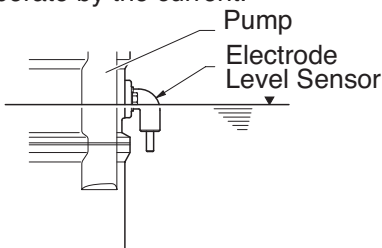
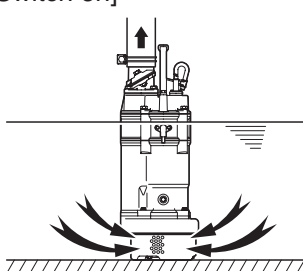
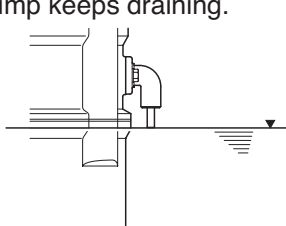
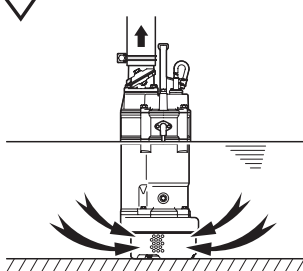
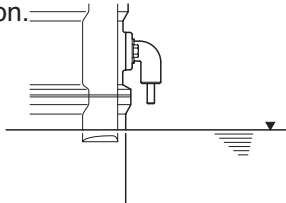
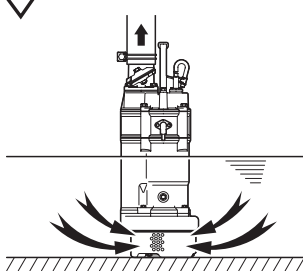
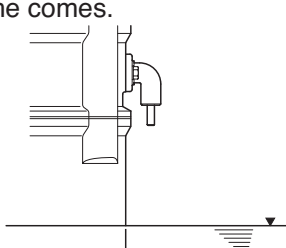
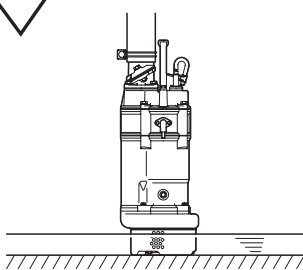
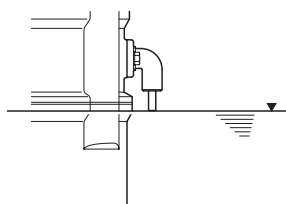
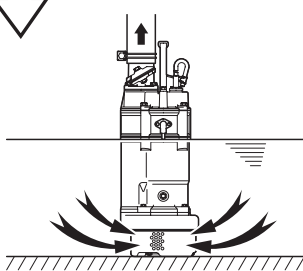
W1 : Starting Water Level
(Default setting value)

W2 : Lowest Starting Level (Continuous Running Water Level)
in case of using an Extension Stick



Operating Principle of the Automatic Pumps

This explains the control form by a combination of an electrode and a timer function. Please understand the performance of this pump and apply it.

Electrode Level Sensor	Pump	Water Level	Condition
Electrode level sensor will submerge and the pump will operate by the current.  (Detection Time : more than one (1) second)	Start operation (Drainage)	Drop	[Switch on] 
When the water level drops and detaches the electrode from the water surface, a timer will start. Pump keeps draining.  (Released the Electrode → The timer is on)	Operation (Drainage)	Drop	 
The operation time with the timer will be approx. 1 minute. * If the water surface touches to the electrode for more than one (1) second within 1 minute, the pump operates continuously even though the timer is on. 	Operation (Drainage)	Drop	 
After 1 minute, the pump will stop. * If the water is drained within 1 minute, the pump continues to run in snore mode until the set time comes. 	Stop	Rise	 
When the water level rises and the water surface touches to the electrode again for more than one (1) second, pump will restart.  (Detection Time : more than one (1) second)	Start operation (Drainage)	Drop	 

7 MAINTENANCE AND INSPECTION

Periodic maintenance and inspection are indispensable in maintaining the pump's performance. If the pump behaves differently from its normal operating condition, refer to the section "9. Troubleshooting" on page 23 of this manual and take appropriate measures at an early stage.
It is recommended that a spare pump be prepared on hand.

Periodical Inspection

1. Before Inspection



WARNING

Make sure that the power supply (i.e. circuit breaker) is disconnected, and remove the cabtyre cable from the terminal board. Failure to do so may cause electrical shock or unintended starting of the pump, which may lead to serious injurious accidents.

(1) Washing the Pump

Remove any debris attached to the pump's outer surface, and wash the pump with tap water. Pay particular attention to the impeller area, and completely remove any debris from the impeller.

(2) Inspecting the Pump Exterior

Verify that the paint is not peeled, that there is no damage, and that the bolts and nuts have not loosened. If the paint has peeled, allow the pump to dry and apply touch-up paint.

Note: *Touch-up paint must be provided by the user. If the pump must be disassembled due to damage or loose bolts or nuts, contact the dealer from whom you purchased the equipment, or the Tsurumi sales office in your area.*

Regular Inspection

Interval	Inspection Item	
EveryDay	■ Measure operating current ■ Measure power supply voltage	● To be below the rated current ● Power supply voltage tolerance (within $\pm 5\%$ of the rated voltage)
Monthly	■ Measuring insulation resistance ■ Inspecting the impeller ■ Inspecting the electrode	● Insulation resistance reference value = $1\text{M}\Omega$ min. <i>Note: The motor must be inspected if the insulation resistance is considerably lower than that obtained during the last inspection.</i> ● If the performance level has decreased considerably, the impeller may be worn. ● Clean the electrode periodically with an abrasive paper or the like.
Half-yearly	■ Inspection of lifting chain or rope ■ Inspecting oil	● Replace if damage, corrosion, or wear has occurred to the chain or the rope. Remove if foreign object is attaching to it. ● Check the oil every 6 months or after 3,000 hours of use, whichever comes first. <i>Note: Refer to the section "Oil Inspection and Change Procedures" on page 18 of this manual.</i>
Yearly	■ Change oil ■ Change mechanical seal	● Change the oil every 12 months or after 6,000 hours of use, whichever comes first. <i>Note: Refer to details of oil inspection and oil change (p. 18)</i> ● <i>Note: Contact the dealer from whom you purchased the equipment, or the Tsurumi sales office in your area to inspect and replace the mechanical seal.</i>
Every 2 to 5 years	■ Overhaul	● The pump must be overhauled even if the pump appears normal during operation. The pump may need to be overhauled earlier if it is used continuously or repeatedly. <i>Note: Contact the dealer from whom you purchased the equipment, or the Tsurumi sales office in your area to overhaul the pump.</i>

Storage

If the pump will not be operated for a long period of time, pull the pump up, allow it to dry, and store it indoors.

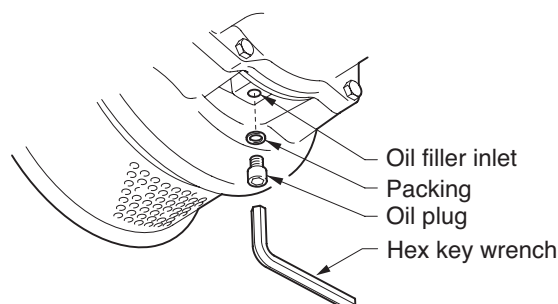
Note: *Be sure to perform a trial operation before reinstalling the pump.*

If the pump remains immersed in water, operate the pump on a regular basis (i.e. once a week) to prevent the impeller from seizing due to rust.

Oil Inspection and Changing Procedures

Inspecting Oil

Remove the oil plug and take out a small amount of oil. The oil can be extracted easily by tilting the pump so that the oil plug faces downward. If the oil appears discolored or intermixed with water, a likely cause is a defective shaft sealing device (i.e. mechanical seal), which requires that the pump be disassembled and repaired.



Changing Oil

Remove the oil plug and drain the oil completely.
Pour a specified volume of oil into the oil filler inlet.

Note:

- *The drained oil must be disposed of by waste disposal contractors in compliance with the laws of the locale where the pump is being used.*
- *The Packing and the O-ring for the oil filler plug must be replaced with a new part at each oil inspection and change.*

Model		Oil Quantity (ml)
KTZ(E)21.5 KTZ(E)22.2	KTZ(E)31.5 KTZ(E)32.2	740
KTZ(E)23.7 KTZ(E)43.7	KTZ(E)33.7	1,250
KTZ35.5	KTZ45.5	1,100
KTZ47.5 KTZ411	KTZ67.5 KTZ611	760
KTZ415	KTZ615	820
KTZ422	KTZ622	2,000

Replacement Parts

The parts listed below are dispensable items. As a rule of thumb, use the replacement period as a guide to replacing these parts.

Part	Replacement condition
Mechanical seal	When oil in oil compartment becomes milky.
Lubricant : Turbine oil VG32 (non-additive)	Every 6,000 hours of 12 months, whichever comes first.
Packing and O-ring	Each time pump is disassembled or inspected
Oil seal (1.5 to 5.5 kW)	When the lip is worn, and each time pump is disassembled or inspected
Labyrinth ring (7.5/11/15/22 kW)	When it becomes worn.
Shaft sleeve (except 3.7/5.5 kW)	When it becomes worn.

■ Prior to Disassembling and Reassembling



WARNING

Before disassembling and reassembling the pump, be sure that the power supply (i.e. circuit breaker) is disconnected, and remove the cabtyre cable from the terminal board. To prevent serious accidents, do not perform a conducting test during disassembly and reassembly.



CAUTION

Be sure to perform a trial operation when starting the pump after a reassembly. If the pump was assembled improperly, it may lead to abnormal operation, electrical shock, or water damage.

This section explains the disassembly and reassembly processes that are involved up to the casing (or oil casing, in the case of 7.5 kW to 22 kW models). Refer to the structural drawing for the respective model before disassembling. Operations involving the disassembly and reassembly of the sealing portion (i.e. mechanical seal) and of the motor require a specialized facility including vacuum and electrical equipment. For these operations, contact the dealer from whom you purchased the equipment, or the Tsurumi sales office in your area.

■ Disassembly Procedure (1.5kW to 5.5kW Models)

Note:

1. Before disassembling, be sure to drain the oil from the pump.
2. The construction of KTZ(E)21.5, KTZ(E)31.5, KTZ(E)22.2, KTZ(E)32.2, KTZ(E)23.7, KTZ(E)33.7, KTZ(E)43.7, KTZ35.5, and KTZ45.5 are identical, however, models KTZ(E)33.7, KTZ(E)43.7, KTZ35.5, and KTZ45.5 are constructed without a shaft sleeve.

- (1) Removing the strainer stand
Remove the hexagonal nut and the plain washer from the bottom and remove the strainer stand from the pump.
- (2) Removing the suction cover
Remove the hexagonal bolt (except 1.5/2.2 kW), plain washer, and the stud bolt, plain washer, and remove the suction cover, suction cover packing from the pump.
- (3) Removing the impeller



WARNING

A worn impeller often has sharp edges. Be careful not to cut yourself on the edges.

Using a box wrench, remove the impeller nut, spring washer, and impeller thread protective cover; then remove the impeller, impeller adjusting washer, shaft sleeve (except 3.7/5.5 kW) from the main shaft.

- (4) If necessary, remove the pump casing, oil seal, O-ring, packing and remove the mechanical seal. After removing the hexagonal bolt and the spring washer, remove the pump casing from the pump. At this time, be careful not to damage the sliding surface of the mechanical seal. Remove the mechanical seal from the main shaft.

Note:

Also refer to the "Mechanical Seal Handling Procedure" that comes with the mechanical seal sold separately as a spare part.

■ Reassembly Procedure

- (1) The reassembly procedure is the reverse sequence of disassembly.

Note:

- After completing reassembly, do not forget to pour the specified amount of oil into the pump.
- The packings and O-rings must be replaced with new parts. Also replace any parts that are worn or damaged.

- (2) Using a clean rag without oil, wipe the sliding surface of the mechanical seal. Apply oil to the outer circumference of the cushion rubber to facilitate insertion.

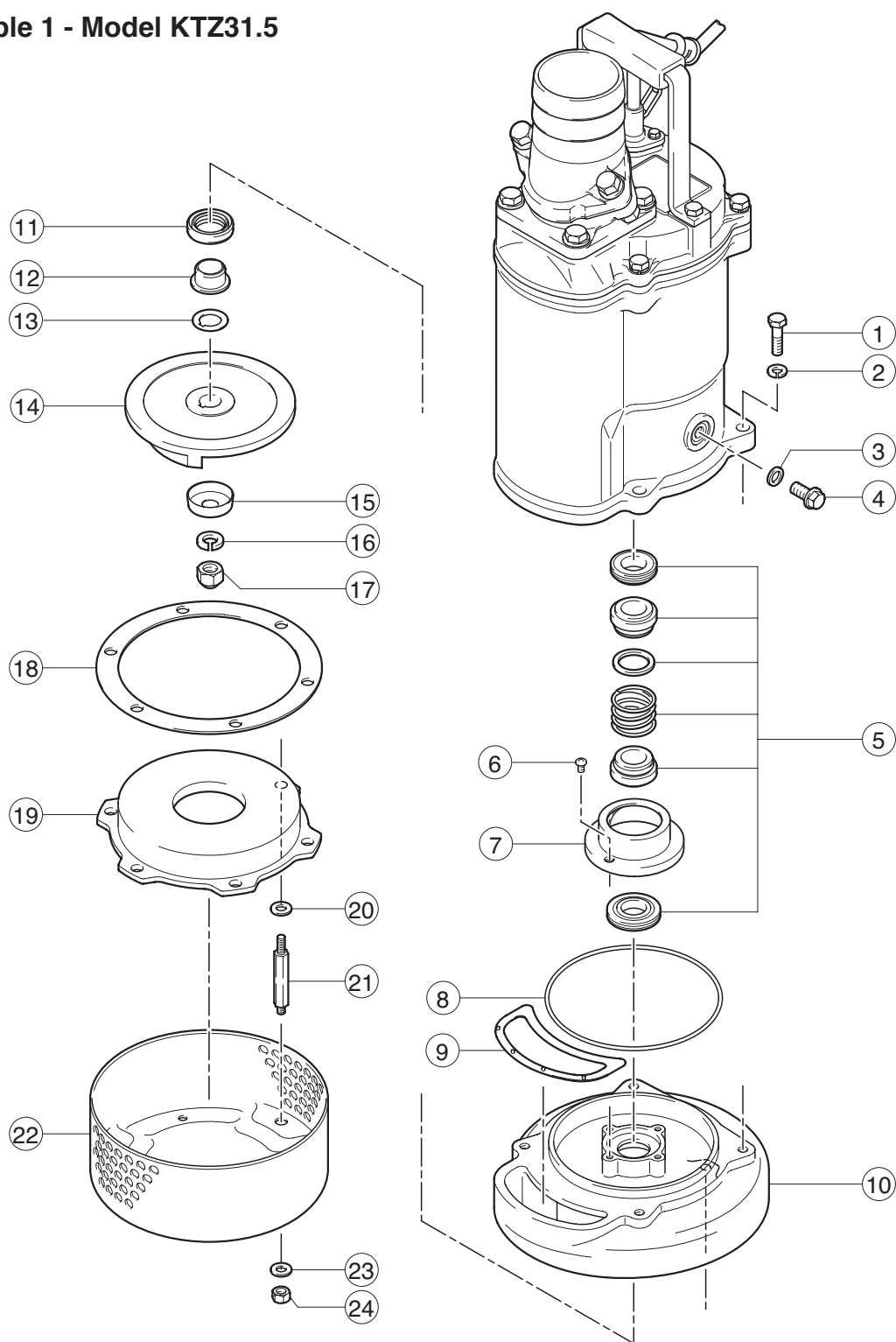
Note:

For further details on how to install the mechanical seal, refer to the "Mechanical Seal Handling Procedure" that comes with the mechanical seal that is sold separately as a spare part.

- (3) After installing the impeller, and after completing the reassembly, check that the impeller rotates smoothly and that it does not come in contact with the suction cover.
- (4) To make sure that the pump operates normally, perform a trial operation before placing the pump back into service.

Disassembly Diagram

Example 1 - Model KTZ31.5



NO.	Part Name	NO.	Part Name	NO.	Part Name
1	Hexagonal bolt	9	Packing	17	Impeller nut
2	Spring washer	10	Pump casing	18	Suction cover packing
3	Packing	11	Oil seal	19	Suction cover
4	Oil plug	12	Shaft sleeve	20	Plain washer
5	Mechanical seal	13	Impeller adjusting washer	21	Stud bolt
6	Round head screw	14	Impeller	22	Strainer stand
7	Oil lifter	15	Impeller thread protective cover	23	Plain washer
8	O-ring	16	Spring washer	24	Hexagonal nut

Disassembly Procedure (7.5kW to 22kW Models)

Note: 1. Before disassembling, be sure to drain the oil from the pump.
2. The construction of KTZ67.5, KTZ411, KTZ611, KTZ415, KTZ615, KTZ422, and KTZ622 are identical, however, models KTZ422, and KTZ622 are constructed without a O-ring (⑰) .

- (1) Removing the bottom plate and the strainer
After removing the hexagonal nut and the plain washer from the bottom, remove the bottom plate and the strainer from the pump.
- (2) Removing the suction cover
After removing the hexagonal bolt, plain washer, stud bolt, and the plain washer, remove the suction cover and the suction cover packing from the pump.
- (3) Removing the impeller
Using a box wrench, remove the impeller nut, hexagonal nut, and the impeller thread protective cover; then remove the impeller and the impeller adjusting washer from the main shaft.



WARNING A worn impeller often has sharp edges. Be careful not to cut yourself on the edges.

- (4) Removing the pump casing
After removing the hexagonal bolt and the spring washer, remove the pump casing, packing, labyrinth ring, O-ring(except 22kW), and the shaft sleeve from the pump.
- (5) Remove the oil casing if necessary, and remove the mechanical seal.
After removing the hexagonal bolt and the spring washer, remove the oil casing from the pump. At this time, be careful not to damage the sliding surface of the mechanical seal. Remove the mechanical seal from the main shaft.

Note: Also refer to the "Mechanical Seal Handling Procedure" that comes with the mechanical seal that is sold separately as a spare part.

Reassembly Procedure

- (1) The reassembly procedure is the reverse sequence of disassembly.

Note: • After completing reassembly, do not forget to pour the specified amount of oil into the pump.
• The packings and O-rings must be replaced with new parts. Also replace any parts that are worn or damaged.

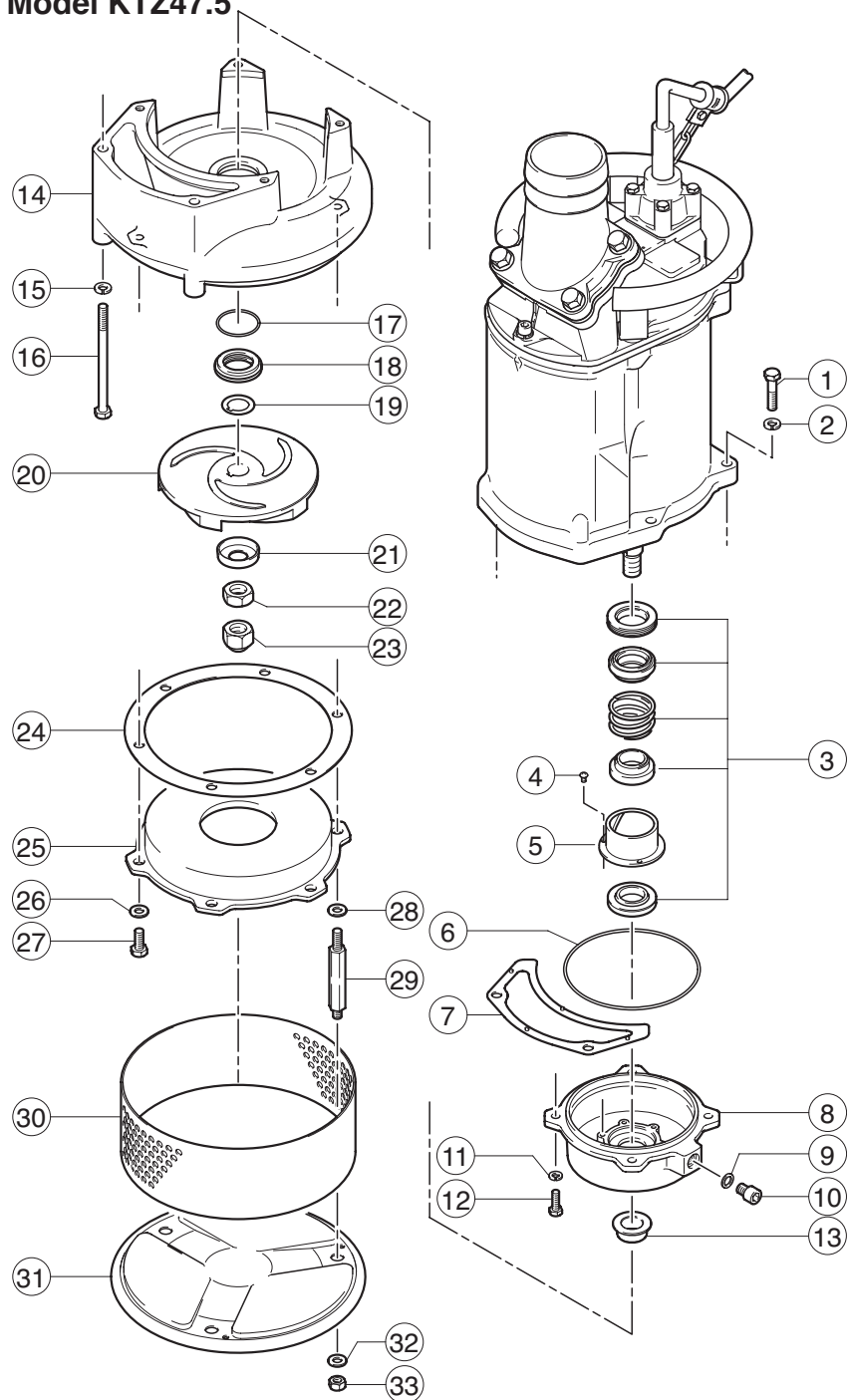
- (2) Using a clean rag without oil, wipe the sliding surface of the mechanical seal. Apply oil to the outer circumference of the cushion rubber to facilitate insertion.

Note: For further details on how to install the mechanical seal, refer to the "Mechanical Seal Handling Procedure" that comes with the mechanical seal that is sold separately as a spare part.

- (3) After installing the impeller, and after completing the reassembly, check that the impeller rotates smoothly and that it does not come in contact with the suction cover.
- (4) To make sure that the pump operates normally, perform a trial operation before placing the pump back into service.

Disassembly Diagram

Example 2 - Model KTZ47.5



NO.	Part Name	NO.	Part Name	NO.	Part Name
1	Hexagonal bolt	12	Hexagonal bolt	23	Impeller nut
2	Spring washer	13	Shaft sleeve	24	Suction cover packing
3	Mechanical seal	14	Pump casing	25	Suction cover
4	Round head screw	15	Spring washer	26	Plain washer
5	Oil lifter	16	Hexagonal bolt	27	Hexagonal bolt
6	O-ring	17	O-ring(except 22kW)	28	Plain washer
7	Packing	18	Labyrinth ring	29	Stud bolt
8	Oil casing	19	Impeller adjusting washer	30	Strainer
9	Packing	20	Impeller	31	Bottom plate
10	Oil plug	21	Impeller thread protective cover	32	Plain washer
11	Spring washer	22	Hexagonal nut	33	Hexagonal nut

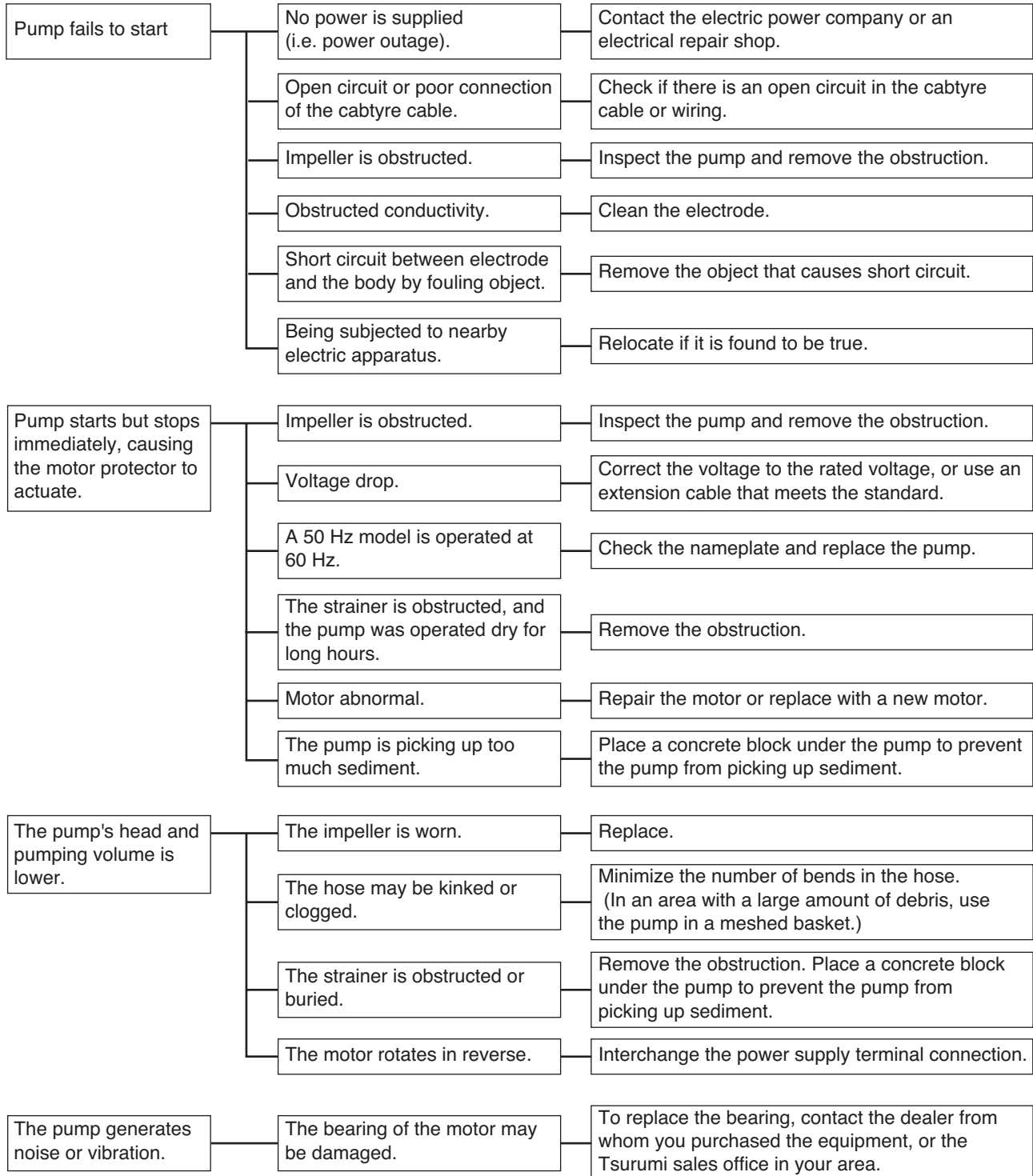
9

TROUBLESHOOTING



WARNING To prevent serious accidents, disconnect the power supply before inspecting the pump.

Read this Operation Manual carefully before requesting repair. After re-inspecting the pump, if it does not operate normally, contact the dealer from whom you purchased the equipment, or the Tsurumi sales office in your area.



The information listed below is needed for repair or for contacting Tsurumi.

Product model	
Manufacturing number	
Purchase date	
Remarks	

Disposal of Product

Properly dispose of the product by disassembling it, presorting the contents, and sending them to the waste material treatment site.