Níže uvedeného dne, měsíce a roku uzavřeli

Fakultní nemocnice Olomouc

státní příspěvková organizace zřízená Ministerstvem zdravotnictví ČR rozhodnutím ministra zdravotnictví ze

dne 25.11.1990, č.j. OP-054-25.11.90

se sídlem: Zdravotníků 248/7, 779 00 Olomouc

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DIČ: CZ00098892

Zastoupená: prof. MUDr. Romanem Havlíkem, Ph.D., ředitelem

bankovní spojení: 36334811/0710

na straně jedné jako *„objednatel"*

a

BioTech a.s.

se sídlem: Služeb 3056/4, 108 00 Praha 10

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bankovní spojení: ČSOB a.s., 475013753/0300

na straně druhé jako *„poskytovatel"*

(Uvedení zástupci obou stran prohlašují, že podle stanov nebo jiného obdobného organizačního předpisu jsou

oprávněni tuto Smlouvu podepsat a k platnosti Smlouvy není třeba podpisu jiné osoby.)

tuto

SMLOUVU O PROVÁDĚNÍ KOMPLEXNÍCH SERVISNÍCH SLUŽEB

uzavřená dle § 1746 a násl. zákona č. 89/2012 Sb. občanského zákoníku v platném znění

I.

Úvodní ustanovení

1. Zúčastněné smluvní strany si navzájem prohlašují, že jsou oprávněny tuto smlouvu uzavřít a řádně plnit závazky v ní obsažené, a že splňují veškeré podmínky a požadavky stanovené zákonem a touto smlouvou.

2. Tato smlouva je uzavírána na základě výsledků otevřeného zadávacího řízení podle zákona č. 134/2016 Sb., o zadávání veřejných zakázek v platném znění zahájeného objednatelem jako veřejným zadavatelem s názvem **„Termocyklér",** interní evidenční číslo **VZ-2022-001233.** Je-li v této smlouvě zmíněna zadávací dokumentace, má se na mysli zadávací dokumentace vztahující se k uvedené veřejné zakázce. Smluvní strany se zavazují plnit podmínky obsažené v této smlouvě, přičemž za závazné se pro obě smluvní strany považuje rovněž zadávací dokumentace a nabídka, kterou prodávající předložil do zadávacího řízení.

3. Poskytovatel potvrzuje, že jsou mu známy veškeré technické, kvalitativní a jiné podmínky nezbytné k poskytování služeb dle této smlouvy a že disponuje takovými odbornými znalostmi, které jsou k poskytování služeb nezbytné.

II.

Předmět smlouvy

1. Předmětem smlouvy je závazek poskytovatele poskytovat údržbu a servis **2 ks Biometra TAdvanced Twin 48** ve FN Olomouc, realizované/pořízené na základě VZ specifikované výše (dále společně jako „předmět servisu") spočívající v periodických kontrolách, ošetřování, seřizování, opravách a zkouškách prováděných v souladu s pokyny výrobce, jak je níže blíže specifikováno. Předmět servisu je vymezen v příloze č. 1, která je nedílnou součástí této smlouvy. Součástí předmětu plnění je také závazek poskytovatele převést na objednatele vlastnické právo k hmotným součástem předmětu plnění včetně oprávnění k nerušenému užívání součástí plnění představující nehmotné součásti předmětu plnění a závazek objednatele zaplatit poskytovateli dohodnutou cenu.

2. Poskytovatel je povinen vykonávat servisní činnost na podkladě této smlouvy s odbornou péčí a v souladu se zájmy objednatele. Poskytovatel odpovídá za výkon servisní činnosti ve sjednaných termínech a v řádné kvalitě.

3. Objednatel se zavazuje způsobem dohodnutým v této smlouvě spolupůsobit při provádění činností dle této smlouvy a zaplatit poskytovateli v této smlouvě dohodnutou úplatu.

4. Místem plnění je: **Hemato-onkologická klinika, Fakultní nemocnice Olomouc**.

III.

Rozsah a termíny provádění údržby a servisu a oprav

1. Činnost dle této smlouvy se vztahuje na předmět servisu, jak je specifikován v příloze č. 1 této smlouvy, jakož i na všechny jeho součásti a příslušenství.

2. Činnost dle této smlouvy zahrnuje:

o Preventivní kontroly předmětu servisu vč. přístrojového vybavení, jeho součástí a příslušenství, dle pokynů výrobce a v souladu se všemi příslušnými právními předpisy.

o Pravidelné kalibrace a nastavení dle pokynů výrobce a v souladu se všemi příslušnými právními předpisy.

o Provádění pravidelných servisních zásahů vyžadovaných výrobcem nebo platnou legislativou. Servisní zásah je poskytovatel povinen provést v periodě **0 za rok,** vždy nejpozději do **5 dnů před uplynutím platnosti předchozí kontroly.**

o Opravy poruch a závad předmětu servisu vč. přístrojového vybavení, jeho součástí a příslušenství, tj. uvedení vadného či porušeného do stavu plné funkčnosti, tj. plné využitelnosti jeho technických parametrů.

o Provádění standardního upgrade předmětu servisu vč. přístrojového vybavení, jeho součástí a příslušenství, a to včetně upgrade softwaru, to vše v rozsahu dle aktuálního stavu rozvoje technologií.

o Provádění pravidelných předepsaných periodických bezpečnostně-technických kontrol, včetně elektrické kontroly, předmětu servisu vč. přístrojového vybavení, jeho součástí a příslušenství v souladu s platnou legislativou. Prohlídku je poskytovatel povinen provést v periodě **0 za rok** , vždy nejpozději **do 5 dnů před uplynutím platnosti předchozí kontroly.**

o Provádění periodických prohlídek – pokud jsou vyžadovány výrobcem či platnou legislativou. Prohlídku je poskytovatel povinen provést v periodě **0 za rok**, vždy nejpozději **do 5 dnů** před uplynutím platnosti předchozí prohlídky.

o Provádění elektrické revize, je-li vyžadována platnou legislativou. **Objednatel si vyhrazuje právo nevyužít této služby u poskytovatele.**

o V případě jakéhokoli zásahu do elektrického zařízení většího rozsahu, případně poruchy provést na vyžádání objednatele novou revizi / kontrolu.

o Instruktáž personálu dle zákona o zdravotnických prostředcích.

o V případě potřeby dodání a instalaci náhradních dílů, jejichž použití je potřebné k zjištění uvedení předmětu servisu vč. přístrojového vybavení, jeho součástí a příslušenství, do stavu plné funkčnosti, tj. plné využitelnosti jeho technických parametrů. V této souvislosti se poskytovatel zavazuje, že zajistí, že po celou dobu trvání této smlouvy bude disponovat dostatečným počtem náhradních dílů, servisních techniků a technických pomůcek nezbytných k provádění činnosti dle této smlouvy.

3. Pro vyloučení všech pochybností se uvádí, že součástí rozsahu této smlouvy je veškerý spotřební materiál potřebný k provedení servisu v rámci pravidelných preventivních prohlídek stanovených výrobcem zařízení nebo příslušnými právními předpisy. Jedná se především, nikoli však pouze, o spotřební materiál definovaný v příloze č. 2 této smlouvy.

4. Poskytovatel je povinen sledovat lhůty stanovené výrobcem předmětu servisu, jakož i zákonné lhůty pro provádění servisu a údržby předmětu servisu vč. přístrojového vybavení, jeho součástí a příslušenství a plánovaný servis a údržbu provádět i bez písemné výzvy objednatele, avšak v souladu s provozními možnostmi objednatele.

5. Poskytovatel je povinen před zahájením každé z činností uvedených výše v tomto článku písemně předem informovat objednatele o nástupu k provedení činnosti, a to nejméně 5 kalendářních dnů předem. Podáním

informace se rozumí den jejího doručení objednateli. Písemné vyrozumění bude zasíláno na adresu sídla objednatele, případně na emailovou adresu **servis@fnol.cz**. V případě, že ve stanoveném termínu nemůže objednavatel umožnit provedení činnosti, vyrozumí o tom obratem poskytovatele a ten v takovém případě provede činnost v nejbližším možném termínu, na kterém se smluvní strany prokazatelně dohodnou, nejpozději však **do 5 dnů** ode dne odpadnutí překážky na straně objednatele. Po tuto dobu není poskytovatel v prodlení s plněním povinnosti, jejíž splnění bylo odloženo z důvodu na straně objednatele.

6. Objednatel je povinen nahlásit potřebu provedení oprav a závad u poskytovatele bez zbytečného odkladu, a to písemně na adresu sídla poskytovatele a následně telefonicky **na + 420 272 701 739,** či formou emailové zprávy **na servis@ibiotech.cz** Dnem doručení se v pochybnostech rozumí třetí den od prokazatelného odeslání zprávy poskytovateli.

7. Objednatel se zavazuje poskytnout poskytovateli veškerou potřebnou součinnost při plnění činností dle této smlouvy, zejména je povinen zpřístupnit poskytovateli místo a předmět vyžadující servisní či jiný zásah dle této smlouvy, a to za podmínky předchozího oznámení dle odst. 5. tohoto článku.

8. Poskytovatel je povinen odstranit poruchy a závady nahlášené objednatelem způsobem dle odst. 6. tohoto článku v následujících termínech:

o není-li dále stanoveno jinak je poskytovatel povinen nastoupit k odstranění nahlášené závady/poruchy bez zbytečného odkladu, nejpozději však **do 2 dnů** od okamžiku jejího nahlášení, nedohodnou-li se smluvní strany písemně jinak. Tato dohoda může být provedena formou písemného zápisu či formou emailového potvrzení odpovědnými zaměstnanci obou smluvních stran,

o není-li dále stanoveno jinak je poskytovatel povinen odstranit nahlášené vady bez zbytečného odkladu, nejpozději však **do 5 dnů** od okamžiku jejího nahlášení, nedohodnou-li se smluvní strany písemně jinak. Tato dohoda může být provedena formou písemného zápisu či formou emailového potvrzení odpovědnými zaměstnanci obou smluvních stran,

o není-li dále stanoveno jinak je poskytovatel povinen v případě opravy trvající déle než **5 dnů** po dobu opravy bezplatně zapůjčit náhradní zařízení s odpovídajícími technickými parametry jako vadné zařízení, nedohodnou-li se smluvní strany na jiném řešení.

9. Neodstraní-li poskytovatel vady a poruchy předmětu servisu vč. přístrojového vybavení, jeho součástí a příslušenství v souladu s touto smlouvou řádně, s odbornou péčí a včas, je objednatel oprávněn nechat odstranit závady a poruchy třetí osobou, či je odstranit sám způsobem dle vlastního uvážení na náklad poskytovatele. Poskytovatel se pak zavazuje nahradit objednateli veškeré účelně vynaložené a prokázané náklady na odstranění závad a poruch. Tímto není dotčen nárok objednatele na náhradu škody, jakož ani nárok na zaplacení smluvní pokuty sjednané dále.

10. Činnosti dle této smlouvy budou poskytovatelem prováděny na adrese sídla objednatele a není-li to z technických důvodů či provozních důvodů na straně objednatele možné, budou prováděny v jiném písemně dohodnutém místě. Spočívá-li důvod v technických podmínkách, náklady na přepravu z a do místa jejich umístění nese poskytovatel a jsou zahrnuty v úplatě dohodnuté dále.

11. Objednatel je povinen řádně poskytnuté služby fyzicky, kvantitativně a kvalitativně převzít od poskytovatele a toto potvrdit podpisem pověřené osoby v záznamu vyhotoveném poskytovatelem, kdy jedno vyhotovení předá objednateli. V případě periodické kontroly spojené s měřením, vypracuje poskytovatel protokol o kontrole, ve kterém uvede naměřené hodnoty, použitá měřidla a celkový výsledek s rozhodnutím o dalším bezpečném provozování předmětu servisu. Tento protokol bude v kopii předán objednateli spolu s fakturou. V případě instruktáže vyhotoví poskytovatel záznam o provedené instruktáži a jeho kopii předá pověřenému zaměstnanci objednatele.

12. Poskytovatel se zavazuje služby a činnosti dle této smlouvy zajišťovat prostřednictvím techniků disponujících zkušenostmi se servisem předmětu servisu a proškolených u výrobce systémů, z nichž sestává předmět servisu. K požadavku objednatele je poskytovatel povinen tyto skutečnosti objednateli písemně doložit a nevyhovění tomuto požadavku se považuje za podstatné porušení této smlouvy.

IV.

Sankce a odpovědnost za škodu

1. Poskytovatel se touto smlouvou zavazuje provádět činnosti v této smlouvě uvedené s odbornou péčí, řádně a v termínech v této smlouvě vymezených.

2. Pro případ, že poskytovatel nedodrží termíny dohodnuté v této smlouvě, či písemně sjednané na základě této smlouvy, zavazuje se uhradit objednateli smluvní pokutu, která **činí 500,- Kč**, za každý den prodlení a každé jednotlivé porušení. V případě prodlení s plněním povinností z této smlouvy vyplývajících delším než 10 dnů, je poskytovatel povinen uhradit za každý další započatý den **1 000,- Kč**. Prodlení delší než 10 dnů je zároveň považováno za podstatné porušení této smlouvy ze strany poskytovatele.

3. Poskytovatel nese odpovědnost za škody/újmy/ušlý zisk, které vzniknou objednateli či třetím osobám v důsledku porušení povinností poskytovatele vyplývajících z této smlouvy, stejně jako za škody/újmy/ušlý zisk, které vzniknou objednateli či třetím osobám v důsledku činností prováděných poskytovatelem.

4. Smluvní strany berou na vědomí, že nárok na zaplacení smluvních pokut dle tohoto článku se nedotýká případných nároků na náhradu škody.

V.

Trvání smlouvy

1. Tato smlouva se stává platnou jejím podpisem oběma smluvními stranami a uzavírá se na dobu určitou v trvání **8 let,** kdy s účinností do ukončení záruky vztahující se k předmětu servisu budou veškeré činnosti vymezené touto smlouvou v souladu s vůlí smluvních stran poskytovatelem prováděny bez nároku na zaplacení jejich ceny, protože ta je již zahrnuta v ceně pořizovací. Povinnosti z této smlouvy vyplývající se tedy poskytovatel zavazuje plnit od okamžiku jejího podpisu v době záruky bezúplatně a s nárokem na odměnu sjednanou níže po uplynutí záruční doby. Stanoví-li kupní smlouva o poskytování plnění, které je upraveno taktéž v této smlouvě jinak, použijí se v záruční době ustanovení smlouvy kupní.

2. Tato smlouva může být ukončena následujícími způsoby:

o písemnou dohodou smluvních stran;

o písemnou výpovědí objednatele s výpovědní dobou v délce 3 měsíců, přičemž tato počne běžet prvním dnem měsíce následujícího po měsíci, v němž byla výpověď doručena poskytovateli;

o písemným odstoupením, v případech stanovených zákonem či touto smlouvou. Oznámení o odstoupení musí obsahovat důvod odstoupení a musí být doručeno druhé smluvní straně. Účinky odstoupení nastanou okamžikem doručení písemného vyhotovení odstoupení druhé smluvní straně. Odstoupení od smlouvy nemá vliv na povinnost poskytovatele zaplatit objednateli smluvní pokuty či povinnosti zaplatit finanční částky z jiného titulu, na jejichž zaplacení vznikl nárok před učiněním odstoupení od smlouvy, event. na jejichž zaplacení vznikl nárok v souvislosti s jednáním či opomenutím poskytovatele před odstoupením od smlouvy.

VI.
Cena a platební podmínky

1. Smluvní strany se dohodly, že cena na základě tohoto ustanovení bude objednatelem poskytovateli hrazena za činnosti dle této smlouvy ode dne uplynutí záruční doby, jež je poskytnuta na předmět servisu specifikovaný v příloze č. 1 k této smlouvě. Do jejího uplynutí se poskytovatel zavazuje tyto činnosti provádět bezplatně, a to s ohledem na skutečnost, že je ve vztahu k objednateli současně prodávajícím předmětu servisu, jehož se týká servis a údržba, jak jsou shora vymezeny. Stanoví-li o sankcích za nesplnění povinností spočívajících v prodlení s odstraněním závad a poruch něco jiného kupní smlouva, na základě, které objednatel předmět servisu specifikovaný v příloze č. 1 k této smlouvě pořídil, mají po dobu trvání záruční doby přednost ustanovení kupní smlouvy.

2. Smluvní strany se dohodly na níže uvedených cenových ujednáních:

a) Hodinová sazba servisního technika činí   1 000 Kč bez DPH,

b) Cestovní náklady - paušální sazba zahrnující kilometrovné, servisní vzdálenost a cenu servisního technika za čas strávený na cestě -   2 000 Kč bez DPH. Cestovní náklady je poskytovatel oprávněn účtovat jen při řádném provedení služby, kdy tuto není poskytovatel oprávněn nedůvodně prodlužovat, tj. jednotlivá oprava/servis musí být provedena v jediný den, provede-li v tentýž den více zásahů, může tuto položku účtovat pouze jednou, totéž platí pro promeškaný čas a servisní vzdálenost,

c) celkový náklad za jednotlivý pravidelný servisní zásah dle článku III. této smlouvy 0 Kč bez DPH,

d) celkový náklad za jednotlivou periodickou BTK (včetně elektrické kontroly) dle článku III. této smlouvy 0 Kč bez DPH,

e) celkový náklad za jednotlivou periodickou prohlídku dle čl. III. této smlouvy 0 Kč bez DPH,

f) celkový náklad za jednotlivou periodickou elektrickou revizi dle článku III. této smlouvy 1 300Kč bez DPH,

g) celkový náklad za jednotlivou instruktáž personálu dle zákona o zdravotnických prostředcích dle článku III. této smlouvy 0 Kč bez DPH.

3. Poskytovatel bere na vědomí, že v souladu s interními předpisy objednatele nese náklady související s vjezdem motorových vozidel do místa plnění.

4. Cena bude objednatelem uhrazena na základě faktur vystavených poskytovatelem a doručených objednateli neprodleně po servisním zásahu, nejpozději však do 15 dnů od provedeného zásahu. Každá jednotlivá faktura

vystavená v rámci smluvního vztahu založeného touto smlouvou musí obsahovat identifikátor veřejné zakázky **VZ-2022-001233.**

5. Poskytovatel je povinen vystavit fakturu s náležitostmi daňového dokladu podle zákona č. 235/2004 Sb., o dani z přidané hodnoty, v platném znění a splatností 60 kalendářních dnů ode dne doručení faktury objednateli prostřednictvím elektronické pošty na adresu fin@fnol.cz, a to každou fakturu samostatným emailem ve formátu PDF včetně standardu ISDOC (Information System Document - standard pro elektronickou fakturaci v České republice), nedohodnou-li se smluvní strany jinak. Faktura ve standardu ISDOC může být přiložena i samostatně mimo PDF. Použitá verze ISDOC musí být ve verzi 6.0.1. a vyšší. Nezbytnou přílohou faktury bude kopie záznamu o provedení činnosti včetně její specifikace.

6. V případě, že faktura nebude splňovat veškeré náležitosti, je objednatel oprávněn fakturu poskytovateli ve lhůtě splatnosti vrátit, přičemž lhůta splatnosti začíná běžet znovu ode dne doručení řádně vystavené faktury objednateli.

7. Cena bude objednatelem hrazena poskytovateli převodem na účet uvedený v záhlaví této smlouvy. Za den úhrady se rozumí den odeslání celé fakturované částky z účtu objednatele na účet poskytovatele.

8. Poskytovatel se zavazuje plnit veškeré své finanční závazky vůči poddodavatelům, s kterými spolupracuje v rámci plnění předmětu smlouvy, bez prodlení. Objednatel si vyhrazuje právo požadovat po poskytovateli prokázání splnění této jeho povinnosti. Poruší-li poskytovatel svůj závazek dle první věty tohoto odstavce, tzn. dostane-li se poskytovatel do prodlení se splněním některého svého finančního závazku vůči některému ze svých poddodavatelů, vznikne objednateli právo uspokojit pohledávku konkrétního poddodavatele poskytovatele přímo, přičemž o takto uhrazenou částku bude ponížena cena dle této smlouvy.

9. Cena bez DPH je maximální, kdy k této ceně bude připočteno DPH dle platné a účinné legislativy k okamžiku uskutečnění zdanitelného plnění.

10. Po uplynutí 3 let platnosti této smlouvy a následně každý rok vždy k 1.1., může být provedena revize smluvních cen, a to za těchto smluvních podmínek.

10.1. Změny sjednaných cen v důsledku změny inflace:

Jednotkové ceny lze změnit v důsledku změny míry inflace zjištěné podle oficiálních údajů ČSÚ za uplynulý kalendářní rok za těchto podmínek:

a) Při změně míry inflace o více jak 2,5 % oproti míře inflace v předchozím kalendářním roce, mohou být úpravy jednotkových cen provedeny tak, že se ceny zvýší maximálně o stejné %, které odpovídá změně míry inflace oproti předchozímu kalendářnímu roku.

b) Jednotkové ceny dle této smlouvy a příloh nebudou měněny po dobu prvních 3 let trvání této smlouvy.

c) Úpravy jednotkových cen mohou být provedeny až v okamžiku, kdy budou vydány oficiální údaje ČSÚ.

d) O úpravu ceny v rámci revize musí smluvní strana písemně požádat druhou smluvní stranu.

10.2. Změny sjednaných cen v důsledku změny minimální mzdy:

Jednotkové ceny lze změnit v důsledku změny výše minimální mzdy na základě změny právní úpravy o výši minimální mzdy v uplynulém kalendářním roce za těchto podmínek:

a) Jednotkové ceny dle této smlouvy a příloh nebudou měněny po dobu prvních 3 let trvání této smlouvy.

b) Úpravy jednotkových cen mohou být provedeny tak, že se ceny zvýší maximálně o stejné %, o které se změní minimální mzda oproti minimální mzdě předchozího roku.

c) O úpravu ceny v rámci revize musí smluvní strana písemně požádat druhou smluvní stranu.

11. Nastane-li některá z podmínek pro změnu sjednané ceny, je poskytovatel oprávněn provést výpočet změny ceny a předložit jej objednateli k případnému odsouhlasení. Smluvní strany v případě oboustranného souhlasu následně změnu sjednané ceny písemně dohodnou formou dodatku k této smlouvě.

VII.

Mlčenlivost

1. Dostane-li se Poskytovatel při poskytování plnění dle této smlouvy do kontaktu s jakýmikoliv osobními údaji či informacemi, skutečnostmi či jinými hodnotami (dále společně jen jako „chráněné údaje"), na které se vztahuje povinnost mlčenlivosti dle platných právních předpisů, nebo budou-li mu tyto při plnění jeho povinností dle této smlouvy zpřístupněny, je povinen o těchto zachovávat mlčenlivost, nezpřístupnit tyto žádné osobě, pokud neobdrží předchozí písemný souhlas od subjektu chráněných údajů. Kromě toho je poskytovatel po uplynutí platnosti této smlouvy, nebo na žádost objednatele povinen vrátit či vydat neprodleně objednateli veškeré dokumenty nebo jiné materiál, které tvoří nebo které obsahují chráněné údaje, disponuje-li jimi.

2. Chráněné údaje je poskytovatel povinen udržovat v přísné tajnosti a nebude je předávat, zpřístupňovat nebo rozšiřovat třetím stranám ani jakékoliv osobě neoprávněné podle této smlouvy; nebude je využívat k jiným než touto smlouvou daným účelům; nebude je využívat pro svůj vlastní prospěch bez předchozího písemného souhlasu subjektu údajů a objednatel.

3. Poskytovatel se zavazuje vynaložit maximální úsilí, aby zajistil, že žádný z jeho zaměstnanců, kterému byly zpřístupněny chráněné údaje, nebude tyto sdělovat během svého zaměstnaneckého poměru u poskytovatele, ani následně po ukončení takového pracovního poměru jakékoliv osobě, která není oprávněna mít k takovým informacím přístup.

4. Povinnost mlčenlivosti poskytovatele v plném rozsahu tohoto článku platí po celou dobu platnosti této smlouvy a také po jejím ukončení bez časového omezení (s výjimkou případů, kdy subjekt údajů a objednatel zprostí písemně poskytovatele povinnosti mlčenlivosti).

5. Závazek mlčenlivosti dle tohoto článku se nevztahuje na informace, u nichž poskytovatel prokáže, že mu byly známy před jejich obdržením v souvislosti s plněním této smlouvy u objednatele; nebo byly známy široké veřejnosti před jejich získáním v souvislosti s plněním této smlouvy u objednatele nebo se následně staly známé široké veřejnosti, aniž by poskytovatel jakkoliv porušil povinnost mlčenlivosti; nebo mu chráněné údaje zpřístupnily třetí strany, na něž se nevztahuje závazek mlčenlivosti a které mají zákonné právo informace takto předávat. Veškeré skutečnosti dle tohoto odstavce je poskytovatel povinen prokazovat relevantními písemnými záznamy.

6. Porušení závazků poskytovatele dle tohoto smluvního článku je podstatným porušením této smlouvy a zakládá oprávnění objednatele od této smlouvy odstoupit.

VIII.

Závěrečná ustanovení

1. Není-li v této smlouvě stanoveno jinak, řídí se práva a povinnosti obou smluvních stran příslušnými ustanoveními zák. č. 89/2012 Sb., občanského zákoníku v platném znění, zvláštních právních předpisů, kterými se provádí občanský zákoník a zvláštních právních předpisů souvisejících. Smluvní strany berou na vědomí a zároveň souhlasí, že k projednání a rozhodování případných sporů, které nebudou vyřešeny smírem, budou příslušné soudy České republiky.

2. Není-li v této smlouvě stanoveno jinak, jsou smluvní strany povinny vzájemně komunikovat písemně prostřednictvím provozovatele poštovních služeb a veškerou komunikaci směřovat k rukám statutárních zástupců na adresu sídel uvedených v záhlaví smlouvy. V případě pochybností se má za to, že písemnost zaslaná doporučenou poštovní přepravou byla doručena třetí den po dni odeslání písemnosti. Bude-li komunikace činěna jinou osobou než statutárním zástupcem, je tato osoba povinna přiložit k písemné komunikaci zplnomocnění statutárního zástupce, jinak k ní nebude přihlíženo a nebude mít žádné právní důsledky. Strany jsou povinny neprodleně si sdělovat změnu adres sídel pro účely komunikace. Neučiní-li tak, nesou důsledky z toho vzniklé (př. marné uplynutí lhůt, nemožnost dovolat se neúčinnosti doručení písemnosti apod.).

3. Veškeré dohody, učiněné před podpisem smlouvy a v jejím obsahu nezahrnuté, pozbývají dnem podpisu smlouvy platnosti, a to bez ohledu na funkční postavení osob, které předsmluvní dojednání učinily. Tato smlouva tak představuje celkovou dohodu smluvních stran na jejím předmětu a nahrazuje všechna předchozí ujednání a dohody dosažené ohledně jejího předmětu.

4. Pokud jakékoliv ustanovení této smlouvy nebo závazek vyplývající z této smlouvy je nebo se kdykoliv stane zcela či částečně neplatným nebo nevymahatelným, taková neplatnost nebo nevymahatelnost nebude mít žádný vliv na platnost a vymahatelnost jakýchkoliv ostatních ustanovení či závazků z této smlouvy vyplývajících a smluvní strany se zavazují nahradit toto neplatné nebo nevymahatelné ustanovení či závazek takovým novým platným a vymahatelným ustanovením či závazkem, jehož předmět bude v nejvyšší možné míře odpovídat předmětu původního ustanovení či závazku.

5. Tuto smlouvu nelze dále postupovat, jakož ani pohledávky z ní vyplývající. Kvitance za částečné plnění a vracení dlužních úpisů s účinky kvitance se vylučují. Použití § 577 zák. č. 89/2012 Sb., občanský zákoník se vylučuje. Určení množstevního, časového, územního nebo jiného rozsahu ve smlouvě je pevně určeno autonomní dohodou smluvních stran a soud není oprávněn do smlouvy jakkoli zasahovat. Použití ustanovení § 557, § 1726, § 1728, § 1729, § 1740, § 1744, § 1757 odst. 2, 3, § 1770, §1950, zák. č. 89/2012 Sb., občanského zákoníku, se vylučuje. Dle § 1765 zák. č. 89/2012 Sb., občanského zákoníku, na sebe poskytovatel převzal nebezpečí změny okolností. Před uzavřením smlouvy strany zvážily plně hospodářskou, ekonomickou i faktickou situaci a jsou si plně vědomy okolností smlouvy, jakož i okolností, které mohou po uzavření této smlouvy nastat.

6. Smluvní strany prohlašují, že tato smlouva byla sepsána na základě pravdivých údajů a jejich svobodné, pravé a vážné vůle a tuto lze měnit pouze dohodou obou smluvních stran obsaženou v písemném, chronologicky očíslovaném dodatku k této smlouvě, podepsaném statutárními zástupci obou smluvních stran. Změna musí

být výslovně označena jako "Dodatek ke Smlouvě". Jiné zápisy, protokoly apod. se za změnu této smlouvy nepovažují.

7. Smluvní strany poté, co si smlouvu přečetly v jejím doslovném znění, prohlašují, že s jejím obsahem souhlasí a že jejímu obsahu zcela porozuměly, přičemž tuto skutečnost stvrzují svými podpisy.

8. Tato smlouva nabývá platnosti dnem jejího podpisu oběma smluvními stranami a účinnosti dle § 6 odst. 3 zákona č. 340/2015 o registru smluv.

9. Seznam příloh, které jsou k této smlouvě připojeny ke dni jejího podpisu a tvoří její nedílnou součást:

Příloha č. 1 – Specifikace předmětu servisu
Příloha č. 2 – Seznam spotřebního materiálu

V Olomouci dne   V Praze dne……………….

………………………………………..   …………………………………………….
Fakultní nemocnice Olomouc   BioTech a.s.
objednatel   poskytovatel

Příloha č. 1 – Specifikace předmětu servisu

Operating Manual

Biometra TAdvanced

High-performance thermal cycler for
DNA amplification by PCR

Operating manual valid from software version ME 1.70 – RE 1.46

Follow these instructions for proper and safe use. Keep for future reference.

Contents

Figures

1 Basic information

1.1 User manual notes

The Biometra TAdvanced is intended for operation by qualified specialist personnel observing this operating manual.

For the Biometra TAdvanced, there are 12 different models available. In the text below these devices are collectively called Biometra TAdvanced. Differences are explained in the corresponding sections.

The operating manual contains information about the design and operation of the Biometra TAdvanced and provides personnel familiar with PCR technology with the necessary know-how for the safe handling of the equipment and its components. The operating manual further includes notes on the maintenance and service of the device and potential causes and remedies of any faults.

These operating instructions apply to all Biometra TAdvanced as of software version ME 1.70 - VRE 1.46 (see "Cycler Information" p.115)

Furthermore, sometimes the terms protocol and program are used synonymously, these are one or more programmed temperature steps with different or the same holding times and cycles.

Conventions

Instructions for actions which occur in chronological order are numbered and combined in action units.

Safety instructions are indicated by pictographs and signal words. The type and source of the danger are stated together with notes on preventing the danger.

The elements of the **control and analysis program** are indicated as **bolt**.

Symbols and signal words

The operating manual uses the following symbols and signal words to indicate hazards or instructions. The safety instructions are always placed before an action.

WARNING

Indicates a potentially hazardous situation which might cause fatal or very serious injuries (deformities).

CAUTION

Indicates a potentially hazardous situation which might cause light or minor injuries.

NOTICE

Provides indications of potential material and environmental damage.

1.2   Intended use

The Biometra TAdvanced is an end-point thermal cycler. It is designed to amplify nucleic acids by repeated cycles of heating and cooling using DNA polymerases in a PCR reaction.

The thermal cycler is developed as product for general laboratory use.

The Biometra TAdvanced combines modern design with user-friendly software. The user interface consists of a touchscreen with a graphical or spreadsheet display that shows the time, the status and the temperature program for each run. Using the touchscreen keyboard, information and program parameters can be entered directly on the screen. Due to the high ramp rates, the Biometra TAdvanced thermal cycler is suitable for fast PCR applications, thereby helping to shorten program run times.

2   Safety instructions

2.1   General notes

For your own safety and to ensure error-free and safe operation of the Biometra TAdvanced, please read this section carefully before commissioning.

Besides the safety instructions in this user manual and the local safety regulations that apply to the operation of the device, the general applicable regulations regarding accident prevention, occupational health and safety and environmental protection have to be observed and complied with.

References to potential dangers do not replace the work protection regulations which must be observed.

2.2   Safety markings on the Biometra TAdvanced

Warning and instruction signs are attached to the device, the meaning of which must be observed.

Damaged or missing warning and instruction signs can lead to incorrect actions with personal injury and material damage. The signs must not be removed. Damaged warning and instruction signs must be replaced immediately!

The following warning and instruction signs are attached to the device:

Warning signs	Meaning	Notice
	Warning of danger place	Proceed with due care when handling samples and working with the Biometra TAdvanced.
	Warning against hot surface	There is a risk of burning at the heated lid, the thermal block, the samples, and the rear of the device.

Instruction signs	Meaning	Notice
	Disposal marking according to WEEE directive	Do not dispose of the device in household waste.
	CE marking	
	Only for People's Republic of China	The device contains regulated substances. Biometra guarantees that the substances will not leak out during the next 25 years if used as intended.

	Keep ventilation slits clear	Keep the ventilation slits on the underside and at the rear of the device clear. Make sure that there are no objects underneath the device (e.g., paper) that may be sucked against the ventilation slot and thus interfere with ventilation.

2.3 Technical condition

The Biometra TAdvanced has been built and certified according to safety standard EN 61010-1. Do not modify the device in any way. Any modification of the device will lead to a loss of warranty and the EN 61010-1 certificate and poses a potential risk.

The following has to be observed:

- The operator must only operate the device in a sound and operationally safe condition. The technical condition must always comply with the legal requirements and regulations.

- Prior to every use the device must be checked for damage and sound condition.

- Any changes in the device affecting its safety must be reported by the operating personnel to the operator without delay.

2.4 Requirements for the operating personnel

The Biometra TAdvanced must only be operated by qualified specialist personnel instructed in the use of the device. The instructions also include imparting the contents of this manual.

In addition to the safety at work instructions in this operating manual the generally applicable safety and accident prevention regulations of the respective country of operation must be observed and adhered to. The operator must ascertain the latest version of these regulations.

The operating manual must be accessible to the operating and service personnel at all times.

2.5 Safety instructions: transport and installation

The following has to be observed:

- Drain the sample block before transporting the Biometra TAdvanced. Make sure there are no sample tubes in the block.

- Only ship the Biometra TAdvanced in its original packaging with the transport lock installed.

- Please verify that the delivery is complete on receipt of the Biometra TAdvanced and check for possible transport damage. In case of claims please contact Biometra GmbH.

2.6 Safety instructions – operation

2.6.1 General

The operator of the Biometra TAdvanced must make sure before each commissioning that the condition of the device including the safety equipment is sound.

The following has to be observed:

- Free access to the power switch on the back of the enclosure has to be ensured during operation.

- The ventilation fittings at the rear of the device must be unobstructed and operational. Covered ventilation grilles or slits etc. may cause the device to break down or may cause damage to it.

- The use of oil between the samples and the sample block is not necessary to achieve an improved heat exchange. However, if you still want to use oil, you should use mineral oil. Do not use silicone oil.

- Be careful to avoid crushing or pinching injuries when closing the device.

The Biometra TAdvanced may cause burns. The following has to be observed:

- The thermal block, the samples and the heated lid reach high temperatures. There is a risk of burns during contact.

- Ensure that the lid is securely closed before starting the program! Do not touch the heated lid!

- The rapid heating of the thermal block can cause liquids to boil explosively. Always wear safety goggles during operation!

- Do not touch hot sample tubes or plates and do not open them or boiling liquid may escape!

- Only use plates and tubes that are suitable for high temperatures (up to 100℃), fit well into the thermal block (no shaking) and whose lids seal tightly!

2.6.2 Safety instructions: protection against explosion and fire

The Biometra TAdvanced must not be operated in an explosive environment.

The Biometra TAdvanced must not be operated with flammable, explosive or volatile substances.

2.6.3 Safety instructions: electrical equipment

Work on the electrical components of the Biometra TAdvanced may only be performed by a qualified electrical technician in accordance with the applicable electrical engineering rules. Life-threatening electrical voltages may occur in the interior of the Biometra TAdvanced!

The following has to be observed:

- Any work on the interior of the device may only be carried out by the customer service of Biometra GmbH and specially authorized technicians.

- The electrical components must be checked regularly by a qualified electrician. Any defects, such as loose connections, faulty or damaged cables, must be repaired without delay.

- Before opening the device it must be switched off at the power switch and the mains plug must be disconnected from the mains outlet!

- The Biometra TAdvanced must be switched off immediately using the power switch (on the equipment back plate) and the mains plug disconnected from the power supply if any faults occur in the electric components.

- Do not operate the device near sources of strong electromagnetic radiation (for example, an unshielded, deliberately operated high frequency source), as these may affect proper operation of the device.

2.6.4 Handling of samples, auxiliary and operating materials

The operator is responsible for the selection of substances used in the process as well as for their safe handling. This is particularly important for radioactive, pathogenic, infectious, poisonous, corrosive or otherwise dangerous substances. For details contact the safety officer responsible for your location. When handling dangerous substances local safety codes and guidelines must be observed. The following general notes do not replace the specific local regulations or the regulations in the EC safety data sheets of the manufacturers for the auxiliary and operating materials.

The following has to be observed:

- Protective goggles and rubber gloves have to be worn when handing reagents.

- If only a few samples are treated, an (empty) tube of the same height must additionally be placed at each corner position of the block. If the number of samples in the block is too low, there is a risk of the tubes being damaged and sample liquid leaking out.

- For your own safety, please observe the potential infectious qualities of the examined biological material.

2.7 Safety instructions – maintenance and repair

The Biometra TAdvanced is usually repaired by the service department of Biometra GmbH or its authorized and trained specialist personnel. Unauthorized repairs can damage the device. Therefore, the operator may generally only carry out the tasks listed in section "Maintenance and care" p. 126.

The following has to be observed:

- The exterior of the device may only be cleaned with a damp, not dripping, cloth after the device has been switched off.

- Do not use alcohol (e.g., methanol or ethanol), organic solvents or abrasives to clean the device.

- Any maintenance on the device may usually only be carried out in the switched-off condition (unless stated otherwise).

- Only use original spare parts, wear parts and consumables. These have been tested and guarantee safe operation.

2.8   Behavior during emergencies

In case of danger or accidents, immediately switch off the Biometra TAdvanced using
the main switch on the equipment back plate. Disconnect the mains plug from the
power supply!

3   Function and setup

The Biometra TAdvanced thermal cycler is available in the following models:

Model		
Biometra TAdvanced 96	with aluminum block	
Biometra TAdvanced 96 G	with aluminum block	with gradient function
Biometra TAdvanced 96 S	with silver block	
Biometra TAdvanced 96 SG	with silver block	with gradient function
Biometra TAdvanced 60	with aluminum block	
Biometra TAdvanced 60 G	with aluminum block	with gradient function
Biometra TAdvanced 384	with aluminum block	
Biometra TAdvanced 384 G	with aluminum block	with gradient function
Biometra TAdvanced Twin 48	with aluminum twinblock	
Biometra TAdvanced Twin 48 G	with aluminum twinblock	with gradient function
Biometra TAdvanced Twin 30	with aluminum twinblock	
Biometra TAdvanced Twin combi	with aluminum twinblock	

The device is controlled by a 7" touchscreen display and an easy-to-use user interface. PCR protocols and run log files can be saved to a connected USB stick. By using the USB functions, PCR protocols can be exchanged easily between devices and run log files can be stored for documentation reasons on a PC.

Fig. 1   The Biometra TAdvanced Thermal Cycler

The Biometra TAdvanced thermal cycler features an automatic restart. If a power failure occurs during the run, the device will continue the run as soon as power is restored. In case of long-term power failure (longer than 30 minutes), the device will keep the sample block at 4 °C (freeze step) and the user can decide to repeat the run with the same samples or to discard them.

The block with gradient function can optionally be used for the optimization of new primer pairs. The Linear Gradient Tool allows the programming of gradients with a defined temperature difference between the rows or columns of the sample block.

This manual provides information on how to use all models of the Biometra TAdvanced Thermal Cycler most effectively. Functions that are only available for certain versions are indicated accordingly, for example, "This function is only available for gradient-enabled thermal cyclers".

3.1   High speed thermoblock

The Biometra TAdvanced Thermal Cycler is available with different block formats and with quick block exchange technology that allows easy exchange of block modules in a few seconds. Most blocks are made of aluminum and offer high ramp rates for fast protocol running times. Additionally, to achieve ultimate performance, a 96 well block made of silver is available. Due to its excellent heat conductivity silver equilibrates extremely quickly, thus providing maximum speed and temperature uniformity. To protect the valuable silver blocks against corrosion, the block surfaces are gold plated.

A rubber seal on the heated lid forms an encapsulated space around the sample block as soon as the lid is closed. The closed space serves to improve the temperature uniformity of the sample block and avoids the formation of condensed water at the final PCR cooling step. Furthermore all blocks are perfectly sealed to prevent condensed water from penetrating into the Peltier elements underneath the sample block and other parts of the electronics. The sealing protects the Peltier elements and prolongs the lifetime of the device.

3.2   High Performance Smart Lid

The Biometra TAdvanced heated lid has been optimized to heat twice as fast as with older models and thus helps to shorten protocol run times. Moreover the heated lid fulfills two other important functions: It prevents the formation of condensation at the reaction tube portion located above the block surface level and it ensures reliable contact between the reaction tubes and the thermoblock by applying constant pressure. Thanks to the integrated clutch mechanism, the pressure applied to the reaction tubes is always the same, regardless of the plasticware height. The combination of the heated lid shape and the reliable contact pressure ensures even temperature distribution between samples, thus significantly improving temperature uniformity.

With one press on the front button, the heated lid gently swings open and locks in its end position. This mechanism ensures that the lid cannot fall down and the heated lid is out of the radius of action while the user inserts PCR tubes or plates. This prevents any risk of injury from crushing or hot surfaces.

3.3   Display

The Biometra TAdvanced thermal cycler features a 7" state-of-the-art color touchscreen user interface. The touchscreen is built-in at a flat angle to ensure reflection-free viewing and ergonomic programming. For programming PCR protocols the software incorporates Biometra's proven spreadsheet philosophy and alternatively offers graphical programming. One touch of a button leads from the spreadsheet to the alternative graphical programming mode. This makes the creation of new programs or editing existing programs fast and easy.

3.4   User-specific quick start of programs

Many other thermal cyclers offer a so-called "List of latest programs used". In the list of latest programs used a certain number of PCR programs is collected and offered for quick start. The list is typically ordered only by date and the user has to search for the desired program. In contrast the Biometra TAdvanced software creates a user-specific list and only the latest programs started by the currently logged-in user are offered for quick start. Even if a lab member does not use the device for a longer time, the information on the latest programs started by this user will not get lost.

For maximum convenience the Biometra TAdvanced software additionally features a program preview. Before the start of a program the protocol steps are summarized in a clearly arranged table by the program preview tool. The preview therefore provides a

comprehensive overview of the protocol structure without the need to access programming screens. The program preview is also available before the quick start of programs.

3.5   Easy programming

Creating new PCR programs takes a lot of time if for each single step all parameters have to be set manually. The Biometra TAdvanced offers two options for easy protocol creation:

- Pre-installed program templates
- Protocol wizard

The Biometra TAdvanced software offers several pre-installed program templates for different applications. The program templates provide a general protocol structure and can be easily adapted for the current experiment.

The protocol wizard offers the comfort to create specific PCR programs by just a few inputs. The protocol wizard is based on program templates for specific polymerases. For up to eight different polymerases program templates can be saved in the Biometra TAdvanced software and just the annealing temperature, cycle number and product length has to be filled in to create a specific PCR program. Optionally two-step or three-step PCR programs can be created by the software. Furthermore the protocol wizard includes a primer annealing temperature calculator and the calculated annealing temperature T_a value can be used for protocol creation.

3.6   Linear Gradient Tool

For optimizing new primer pairs in a single run the Biometra TAdvanced can optionally be equipped with a gradient function. Finding the best primer annealing temperature is crucial for the specificity and efficiency of PCR reactions. Often the optimization of experiments is conducted to a limited extent only leading to unspecific byproducts or reduced PCR sensitivity. By using the gradient function, new primer pairs with unknown annealing temperatures can be tested quickly and optimized in a very short time.

For maximum convenience the Biometra TAdvanced offers the Linear Gradient Tool. For most other devices the temperature difference from row to row or from column to column in a gradient step varies across the sample block. The Biometra TAdvanced Linear Gradient Tool enables the programming of gradient steps with a defined temperature increment between the columns or rows. The Linear Gradient Tool option allows the comfortable creation of gradient steps and thus the best annealing temperature can be easily transformed to a non-gradient protocol.

3.7   GLP compliance

The software can manage up to 90 user accounts. With each system start the Biometra TAdvanced performs an initial self-test and additionally the software offers an extended self-test that can be initiated by the user. The results of the extended self-test are summarized in a protocol and stored by the device. In addition to the self-test functions, the

device creates and stores log files for each single run. For long-term storage, the log files and extended self-test protocols can be exported as a proprietary file format.

3.8   Open system philosophy

The Biometra TAdvanced is an open system regarding consumables and reagents. Depending on the sample block, the system can be used with single tubes, strips or plates. PCR plates can be standard profile or low profile and they can be full-skirted, half/semi-skirted or non-skirted. The Biometra TAdvanced can handle all kinds of plates and the plasticware be sealed with domed lids, flat lids, sealing foil or other technologies. Regardless of the sealing method used, thanks to the HPSL technology (see section "High Performance Smart Lid" p. 18) the same pressure is always applied to the consumables for absolutely reproducible conditions.

The Biometra TAdvanced thermal cycler is not limited to reagents from a specific vendor and can be used with any kind of polymerase. Regardless of whether isothermal, hot start or non-hot start polymerases are used, the Biometra TAdvanced will produce reliable results. By programming a pause step for the initial denaturation, for example, the system can be used for manual hot start applications. After inserting the samples into the heating block, the PCR protocol can be started just by pressing "continue".

3.9   Order numbers

Instruments incl. block and base unit

Model	Block type	Gradient range	Block exchange	Order numbers
Biometra TAdvanced 96	Aluminum	–	✔	846-x-070-211
Biometra TAdvanced 96 G	Aluminum	30 ℃	✔	846-x-070-201
Biometra TAdvanced 96 S	Silver	–	✔	846-x-070-251
Biometra TAdvanced 96 SG	Silver	40 ℃	✔	846-x-070-241
Biometra TAdvanced 60	Aluminum	–	✔	846-x-070-210
Biometra TAdvanced 60 G	Aluminum	30 ℃	✔	846-x-070-200
Biometra TAdvanced 384	Aluminum	–	✔	846-x-070-224
Biometra TAdvanced 384 G	Aluminum	24 ℃	✔	846-x-070-214
Biometra TAdvanced Twin 48	Aluminum	–	✔	846-x-070-212
Biometra TAdvanced Twin 48 G	Aluminum	20 ℃	✔	846-x-070-202
Biometra TAdvanced Twin 30	Aluminum	–	✔	846-x-070-213
Biometra TAdvanced Twin combi	Aluminum	–	✔	846-x-070-215

G = gradient, S = silver block
X = 2 for 230 V EN/DE, 4 for 115 V EN, 5 for 100 V EN/DE

Base unit and block modules

Block model	Block type	Gradient range	Block exchange	Order numbers
Block module 96	Aluminum	–		846-070-231
Block module 96 G	Aluminum	30 ℃		846-070-221
Block module 96 S	Silver	–		846-070-271
Block module 96 SG	Silver	40 ℃		846-070-261
Block module 60	Aluminum	–		846-070-230
Block module 60 G	Aluminum	30 ℃		846-070-220
Block module 384	Aluminum	–		846-070-234
Block module 384 G	Aluminum	24 ℃		846-070-224
Twinblock module 48	Aluminum	–		846-070-232
Twinblock module 48 G	Aluminum	20 ℃		846-070-222
Twinblock module 30	Aluminum	–		846-070-233
Twinblock module combi	Aluminum	–		846-070-235
Base unit				
TAdvanced base unit				846-x-070-280

G = gradient, S = silver block

4   Installation and commissioning

4.1   Scope of delivery

The scope of delivery includes:

- Thermal cycler

- Mains cable

- Operating instructions

- Quick reference guide

Please keep the original packaging in case the device needs to be returned. The shipping box for the Biometra TAdvanced thermal cycler contains a specially developed foam system for the transport of high quality electronic devices.

4.2   Unpacking and inspection

Unpack and carefully check the device. Immediately report any damage to Biometra GmbH. Do not attempt to operate the device if there is any visible damage.

Keep the original packaging for possible return. The Biometra TAdvanced must always be transported in its original packaging. If the packaging is no longer available, please contact Biometra GmbH.

4.3   Setting the operating voltage

WARNING

Danger of electric shock! Before commissioning the device, make sure that the voltage selector setting on the underside of the device corresponds to the mains voltage in your laboratory.

The Biometra TAdvanced can be operated at 100, 115 or 230 volts.

- Set the operating voltage by turning the dial on the underside of the Biometra TAdvanced to the desired voltage. You can do so with a coin.
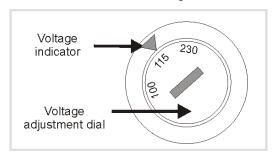
Fig. 2   Voltage selector switch on the underside of the device

4.4   Commissioning

4.4.1   General setup

WARNING

Danger of electric shock! Prior to commissioning, please make sure that the operating voltage set on the device is the same as the mains voltage (see section "Setting the operating voltage" p. 22).

NOTICE

Do not cover the ventilation slits! Ensure that the ventilation slits are clear. Insufficient ventilation may cause the device to overheat.

- Make sure that there are no objects underneath the device (e.g., paper) that may be sucked against the ventilation slot and thus interfere with ventilation.

- Place the device at a minimum distance of 10 cm between the rear of the device and the wall or other objects.

- In case of several cyclers side by side running simultaneously we would recommend to keep a distance of at least 10 cm between every thermal cycler.

- Place the Biometra TAdvanced on a solid dry surface.

- If the Biometra TAdvanced has been moved, allow the device to adjust to room temperature before switching it on for the first time (1 to 6 hours).

- Connect the Biometra TAdvanced to a grounded mains outlet using the mains cable supplied.
  Make sure that the mains switch and the mains cable are easily accessible. This is important if the device needs to be disconnected from the mains voltage.

- The display contrast can be adjusted according to the respective lighting conditions (see section "Display brightness" p. 97).

4.4.2   Installation when used in a network

When using the thermal cycler together with the Biometra TSuite thermal cycler management computer software, please follow these instructions for connection in a network:

- The thermal cycler can be connected to a computer via the company network. The thermal cycler is usually configured for a network connection with a DHCP server in the delivery state (please refer to the "Network" chapter 11.1.4).

- This requires an Ethernet cable (minimum requirements: Cat 5e performance class, STP cable structure, max. 30 m length).

- You can connect the thermal cycler and the computer to the DHCP server via the Ethernet cable and a router (e.g. such a device https://www.tp-link.com/us/home-networking/wifi-router/tl-wr841n/), alternatively you can connect the computer and the thermal cycler to the company network if this is allowed by your company's IT policies.

- For an alternative direct connection of the thermal cycler, the thermal cycler must be changed to a network connection with a fixed IP (e.g. IP 192.168.0.30, subnet mask 255.255.255.0) (please see chapter "Network" 11.1.4).

  The network card must also be changed to a fixed IP(V4) via the network adapter settings under Windows (e.g. IP 192.168.0.10, subnet mask 255.255.255.0).

- The PC network card should comply with the IEEE 803.2ab_1999 autocrossover standard, otherwise a crossed network line is required. Newer network cards usually comply with this standard.

- An Ethernet cable is available as an optional accessory.

5 Control elements

5.1 Biometra TAdvanced front view

Fig. 3   Front view of the Biometra TAdvanced

1	Dial for adjusting the contact pressure	3	Display
2	Lid closing button	4	USB port

5.2 Biometra TAdvanced rear view

The Ethernet port, mains plug and mains switch are located at the rear of the Biometra TAdvanced.

Fig. 4   Rear view of the Biometra TAdvanced

1	Ethernet port	3	Fuse holder
2	Mains plug	4	Mains switch

5.3   Quick block exchange

The option for quick block exchange is available for all model types.

To change the block:

1. Switch off the device.

2. Lift release lever on the backside (1 in Fig. 5) then pull block slowly to the back (2).

3. Insert the new block module carefully from the back in the base unit (2) until the plugs at the front of the module are in contact with the socket inside the instrument.

4. Then carefully push down the release lever (1).

5. Switch on instrument.

    ✓   During boot up the block module (block format and serial number) is automatically recognized.
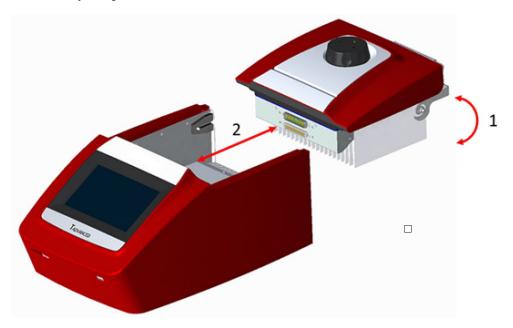
Fig. 5   Quick block exchange

5.4   High Performance Smart Lid (HPSL)

The Biometra TAdvanced has a height-adjustable lid for optimal contact pressure on the samples.

5.4.1   Closing the lid

1. Place the samples in the block, then close the lid until you feel the button in the front click into position.

2. Turn the lid wheel clockwise until the clutch mechanism is activated (you will hear a clicking noise).

NOTICE

The strength of the lid contact pressure has been designed for a fully populated block. If only a few samples are to be used in the block, place an additional two (empty) tubes of the same height in the four corner positions of the block (see Fig. 6). Otherwise the sample tube may be damaged from excess contact pressure.

Never attempt to close the heated lid with force! This may damage the device.

96 Well Block

48 well block   30 well block   combi block
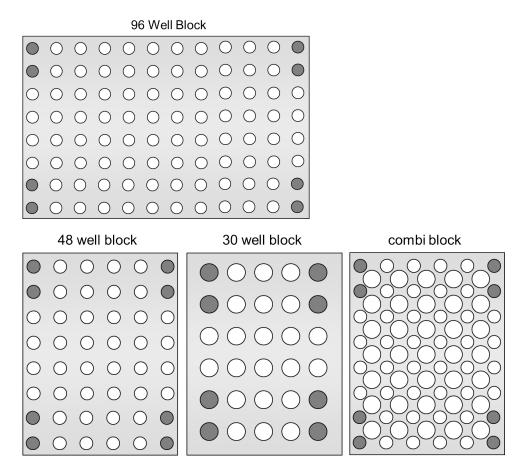
Fig. 6   Placement of sample tubes in different block systems

5.4.2   Opening the lid

NOTICE

Never open the lid under pressure!

Always follow the sequence below when opening the lid. If the lid is opened under pressure, the locking mechanism may be damaged.

- Reduce the contact pressure of the lid completely by turning the lid wheel anticlockwise until there is no resistance.

- Open the lid by pressing the button on the front of the lid.

   ✓   The lid opens and locks in a defined end position.

5.5   The Biometra TAdvanced software

The Biometra TAdvanced thermal cycler features a 7" color touchscreen and a conven-ient software for operation.
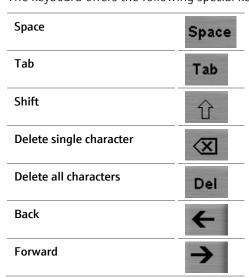
5.5.1   Keyboard

For some applications, names, addresses or passwords have to be defined. For this pur-pose, the Biometra TAdvanced software offers a keyboard to enter characters, digits and special characters.

Fig. 7   Keyboard

The keyboard offers the following special keys:

Space	Space
Tab	Tab
Shift	⇧
Delete single character	⌫
Delete all characters	Del
Back	←
Forward	→

Note: For some functions the maximum number of characters is limited. Usernames, passwords and program names can have a maximum of 13 characters and user initials a maximum of 3 characters.
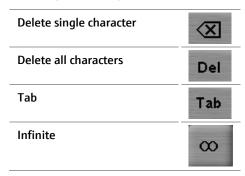
5.5.2   Keypad

In some screens of the Biometra TAdvanced software digits have to be entered. For this purpose, the software features a keypad integrated in some screens:

Fig. 8   Keypad

The keypad can be used to enter digits, dots, minus signs and infinite. In addition the following special keys are available:

Delete single character	
Delete all characters	
Tab	
Infinite	

5.5.3   Cursor keys

The Biometra TAdvanced software uses lists, tables or graphical representations. Whenever the number of entries becomes higher than the maximum number that can be displayed on a screen, the software will show cursor keys for navigation.

Scroll up		Scroll right	
Scroll down		Scroll left	

5.5.4   Confirm or Cancel

On many screens user entries have to be confirmed to avoid unintended operating errors. Press **Confirm** to accept entries or processes or **Cancel** to reject entries or processes.

Confirm	
Cancel	

5.5.5   List of commands and icons used

The Biometra TAdvanced software uses the following icons:

Command			Icon
Home			
Next			
Back			
	Right		
	Left		
	Up		
	Down		
		Confirm	
		Cancel	
Login			
	User management		
		User management ON/OFF	
		New user	
		Delete user	
		Edit user	
Protocol Wizard			
	New Polymerase		
	Edit Polymerase		
	Delete Polymerase		

Command			Icon
		Annealing temperature calculator	Calc Ta
		Edit primer concentration	
		Edit primer	ACGT
		Calculate primer	
		Save annealing temperature Ta	Ta✓
		Protocol Wizard Info	ⓘ
Incubation			
	Start incubation		▶
Programs			
	New program/new from template		
	Open template		
	Copy program/copy all programs		
	Delete program/ delete all programs		
	Edit program		
	Start program		
	Quick selection (program or user)		↖ ↗ ↙ ↘
	Stop program		■
	Done		✓

Command			Icon
	Save program		⊟
	Save as		⊟✎
	Pause program		❚❚
	Start program/ continue program		▶
	Skip step		▶▶
	Choose block start program		▦▶
	Block stop		▦■
		Graphical view	⌐⟋
		Spreadsheet view	⊞
		Gradient display	◢
		Edit step	⌐✎
		Insert step	⌐+
		Delete step	⌐-
		Temperature increment	△T
		Time increment	△t
		Heating rate	△R
		Gradient	Grad
		Linear Gradient Tool	Lin.

Command			Icon
		Standard gradient programming	Std.
		Preheating OFF	Off
		Preheating ON	On
Tools			✕
	Settings		⚙
		Date and time	🕐
		Automatic user log-out	
		Beeper	🔊
		Network	
		Display brightness	☀
		Display darker	☀
		Display brighter	☀
		Touchscreen calibration	
		Factory settings	
	Documentation		
		Run log file	
		Run log file overview	
		Save run log file to USB	

Command			Icon
		Save all run log files to USB	
		View run log file	
		View program	
		Power on log file	
		Self-test log file	
		Error log file	
	Extended self-test		
		Start extended self-test	
		Stop extended self-test	
	Service info file		
	Backup		
		Save backup file	
		Load backup file	
		Delete backup file	
		Delete all backup files	
	Cycler information		
	Contact		

6 Operation

6.1 Power on self-test

After the Biometra TAdvanced is switched on, the device performs an automatic self-test (power on self-test). During the test the device shows the following screen:

Fig. 9 **Start screen**
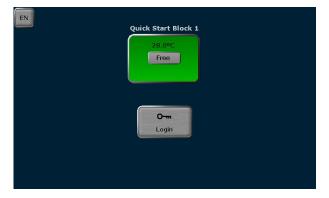
For the power on self-test a log file is created and stored in the thermal cycler memory (see section "Power On Logfile" p. 109).
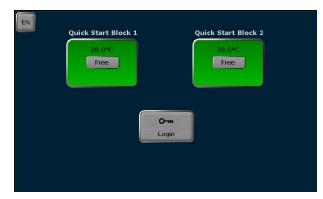
6.2 Login screen

After the Biometra TAdvanced has performed the power on self-test, the login screen is displayed. The login screen offers the following functions:

Command	Function	Section
Login	Starts the login dialog.	See section "Login" p. 36
Block	Shows the current block status. If a block is free, a touch on the button leads to a list of previously used or changed programs for quick start (not user-specific in the login screen).	See section "Block status" p. 38 and section "Quick start function" p. 39
EN/DE	Changes the language setting for the login screen.	For user-specific software language settings see section "Editing user settings" p. 102

Biometra TAdvanced Mono   Biometra TAdvanced Twin

Fig. 10   Login screen

6.3   Login

After starting the Biometra TAdvanced, the login screen is displayed. To log in as an existing user, press **Login**.

Login	

In the next screen select a user by pressing the corresponding button.
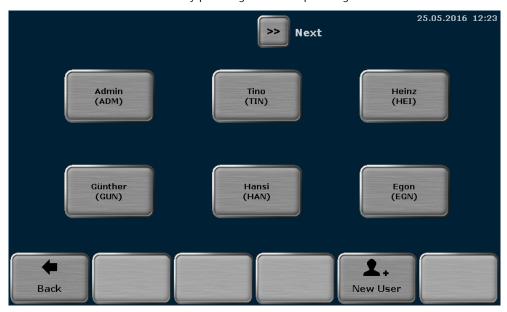
Fig. 11   Select user screen

Note: The position of the buttons can change. The button for the most recently logged in user is always shown in the first position at the top left of the screen. All the other buttons become arranged from top left to bottom right according to the date and time of the latest user login. If more than 6 user accounts are available, you might need to use the **Left** or **Right** cursor keys to turn the page (see section "Cursor keys" p. 29).
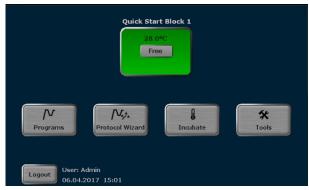
Touch the **Password** input field and enter the password using the Biometra TAdvanced keyboard (see section "Keyboard" p. 28). The default password for the **Admin** administrator is "Admin". Please note that the password query is case sensitive.
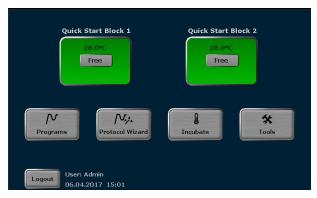
Fig. 12   Enter password screen

6.4   Home screen

After user login the Biometra TAdvanced software shows the home screen. The home screen offers the following functions:

Biometra TAdvanced Mono   Biometra TAdvanced Twin

Fig. 13   Home screen

Command	Function	Section
Programs	Viewing, running and editing programs	See section "Creating, editing and saving programs" p. 47
Block	Shows the current block status. If a block is free, a touch on the button leads to a list of previously used or changed programs for quick start	See section "Block status" p. 38 and section "Quick start function" p. 39

Incubate	For running a sample block at a constant temperature	See section "Incubation mode" p. 42
Tools	Settings, documentation, extended self-test, cycler information and diagnosis mode	See section "Tools" p. 91
Logout	User logout	

6.5   Block status

In the login screen (see section "Login screen" p. 35) and in the home screen (see section "Home screen" p. 37) a special button with information on the current block status is shown. The sample block status can be **Free**, **Running** or **Pause** and is indicated by the color of the button and the textbox in the middle of the button (2 in Fig. 14). In the line above the textbox the current block temperature is shown (1)- If the temperature is higher than 70℃, the characters are shown in red and the warning Hot plus the corresponding warning symbol are displayed. In the line below the textbox the remaining runtime is shown (3). The sample block number is shown above the button.
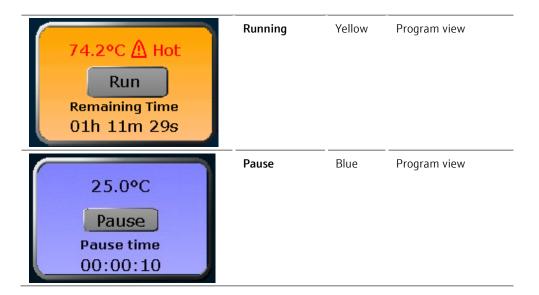
1   Block temperature
2   Block status
3   Remaining run time / pause time

Fig. 14   Block status/quick start button

The following table summarizes the different button colors and sample block statuses. When the button is pressed, it depends on the sample block status which function is activated in the Biometra TAdvanced software. If the status is **Running** or **Pause**, a touch of the button will lead to the program view (see section "Display during a run" p. 74). If the status is **Free**, the quick start function is activated (see section "Quick start function" p. 39).

Button	Block status	Color	Function
	Free	Green	Quick start function

74.2°C ⚠ Hot Run Remaining Time 01h 11m 29s	**Running**	Yellow	Program view
25.0°C Pause Pause time 00:00:10	**Pause**	Blue	Program view

6.6   Quick start function

Biometra TAdvanced
Mono

Note: Programs can only be started by users with the right **Start/stop programs** activated (see section "Editing user settings" p. 102).

Enable a user to start or stop programs	Start/stop programs

The Biometra TAdvanced software offers a quick start function for previously used programs. To use the quick start function, press the block status display button in the login screen (see section "Login screen" p. 35) or in the home screen (see section "Home screen" p. 37).

Note: The quick start function can only be activated if the current block status is **Free** (see section "Quick start function" p. 39). If the status is **Running** or **Pause**, a touch of the button will lead to the program view screen instead.

If the block status button is used in the login screen before a user is logged in, a list of the programs most recently used on the thermal cycler are offered for quick start. If, on the other hand, the button is used in the home screen after user login, the software will show a user-specific list of the latest programs used for quick start.

Login screen	List containing the latest programs used
Home screen	User-specific list containing the latest programs used

The latest programs used are summarized in a table.

Fig. 15   Program quick start screen (Biometra TAdvanced Mono)

Select the program for quick start in the table and press the **Start** button to start the selected program. If necessary, the program can be edited before the start or a new program can be created based on a template (see section "Programming modes" p. 47).

Start	

Note: Programs offered for quick start can only be edited or deleted by users with the right **Write/Delete own programs** activated (see section "Editing user settings" p. 102).

Enable a user to edit or delete own programs	

Press the corresponding button to activate the programming mode or select a program from the list of templates:

Edit	
New from template	

Biometra TAdvanced Twin

Note: Programs can only be started by users with the right **Start/stop programs** activated (see section "Editing user settings" p. 102).

Enable a user to start or stop programs	

The Biometra TAdvanced software offers a quick start function for previously used programs. To use the quick start function, press the block status display button in the login

screen (see section "Login screen" p. 35) or in the home screen (see section "Home screen" p. 37).

Note: The quick start function can only be activated if the current block status is **Free** (see section "Quick start function" p. 39). If the status is **Running** or **Pause**, a touch of the button will lead to the program view screen instead.

If the block status button is used in the login screen before a user is logged in, a list of the programs most recently used on the thermal cycler are offered for quick start. If, on the other hand, the button is used in the home screen after user login, the software will show a user-specific list of the latest programs used for quick start.

Login screen	List containing the latest programs used
Home screen	User-specific list containing the latest programs used

The latest programs used are summarized in a table.

Fig. 16   Program quick start screen (Biometra TAdvanced Twin)

Select the program for quick start in the table and press the **Start** button to start the selected program. If necessary, the program can be edited before the start or a new program can be created based on a template (see section "Programming modes" p. 47).

Start on block ...	

To switch between the sample blocks press the button with the corresponding number.

Sample block 1	
Sample block 2	

To start a program on both sample blocks press the following button:

Choose block start program	

By activating the checkboxes select the sample blocks for program start.
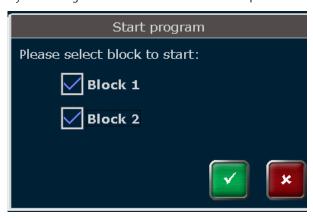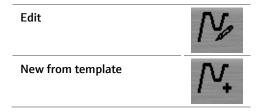
Fig. 17   Multiblock selection query

Note: Programs offered for quick start can only be edited or deleted by users with the right **Write/Delete own programs** activated (see section "Editing user settings" p. 102).

Enable a user to edit or delete own programs	Write/delete own programs

Press the corresponding button to activate the programming mode or select a program from the list of templates:

Edit	
New from template	
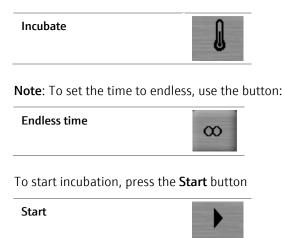
6.7   Incubation mode

Biometra TAdvanced
Mono

Note: Programs can only be started by users with the right **Start/stop programs** activated (see section "Editing user settings" p. 102).

Enable a user to start or stop programs	Start/stop programs

The incubation mode allows samples to be incubated at a constant temperature for an indefinite period of time. Press the **Incubate** button and in the next screen set the values for the block temperature and hold time using the keypad. Set whether the heated lid should be on or off and whether it should preheat or not using the corresponding buttons (see Fig. 18).

Incubate	

Note: To set the time to endless, use the button:

Endless time	∞

To start incubation, press the **Start** button

Start	▶
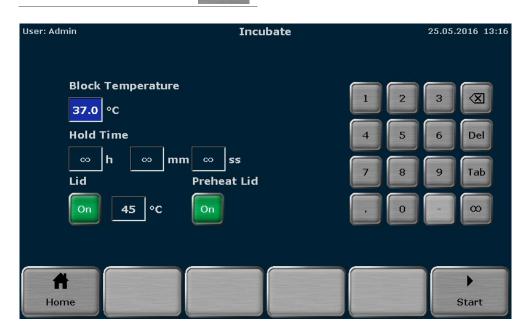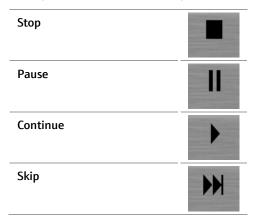
Fig. 18   Incubation mode screen (Biometra TAdvanced Mono)

During incubation the following commands can be used:

Stop	■
Pause	❚❚
Continue	▶
Skip	▶▶❙

Note: To stop the incubation, use the corresponding command. Do not switch off the device while the incubation is running. The device will react like after a power failure and will restart the incubation step when it is switched on next time.

Biometra TAdvanced Twin

Note: Programs can only be started by users with the right **Start/stop programs** activated (see section "Editing user settings" p. 102).

Enable a user to start or stop programs	Start/stop programs

The incubation mode allows samples to be incubated at a constant temperature for an indefinite period of time. Press the **Incubate** button and in the next screen set the values for the block temperature and hold time using the keypad. Set whether the heated lid should be on or off and whether it should preheat or not using the corresponding buttons (see Fig. 18).

Incubate	

Note: To set the time to endless, use the button:

Endless time	∞

To start incubation, press the following button:

Start on block ...	▶
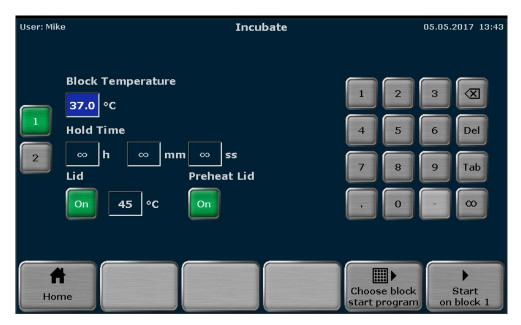
Fig. 19   Incubation mode screen (Biometra TAdvanced Twin)

To switch between the sample blocks press the button with the corresponding number.

Sample block 1	
Sample block 2	

To start incubation on both sample blocks press the following button:

Choose block start program	
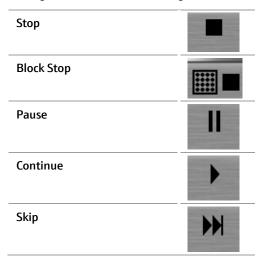
By activating the checkboxes select the sample blocks for program start.

Fig. 20   Multiblock selection query (1)

During incubation the following commands can be used:

Stop	
Block Stop	
Pause	
Continue	
Skip	

Note: To stop the incubation, use the corresponding command. Do not switch off the device while the incubation is running. The device will react like after a power failure and will restart the incubation step when it is switched on next time.

After you have pressed the **block stop** button, choose the block to stop incubation in the following query.
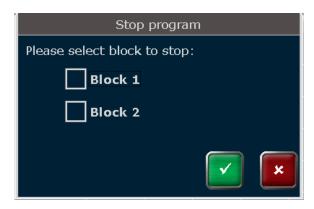
Fig. 21   Multiblock selection query (2)

7   Creating, editing and saving programs

7.1   Programming modes

The Biometra TAdvanced software offers spreadsheet or graphical programming. Use the buttons to toggle between the two modes. The following screenshots show the spreadsheet and graphical programming mode.

Graphical view	
Spreadsheet view	

Fig. 22   Spreadsheet programming
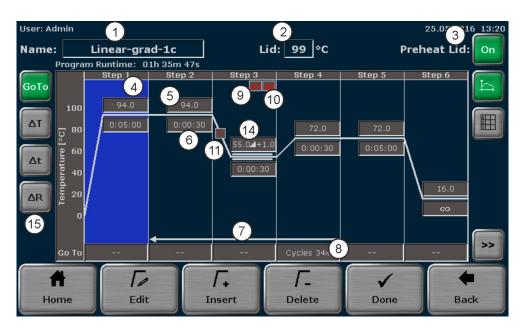
Fig. 23　Graphical programming

Both programming modes show the same information but in different ways. In the spreadsheet mode all parameters are summarized in a table. In the graphical mode symbols are displayed for some parameters (see the table below). Toggle to the spreadsheet mode to view the settings for these parameters.

Parameter	Spreadsheet mode	Graphical mode	Section
Program name	①	①	See section "Assigning program names" p. 51
Heated lid temperature ℃	②	②	See section "Setting the heated lid temperature" p. 51
Preheat lid mode	③	③	See section "Preheating the heated lid" p. 52
Step number	④	④	See section "Editing all parameters of a step" p. 53
Temperature ℃	⑤	⑤	See section "Editing all parameters of a step" p. 53
Hold time h:mm:ss	⑥	⑥	See section "Editing all parameters of a step" p. 53
Go to	⑦, ⑫	⑦	See section "Programming loops" p. 54
Cycles	⑧, ⑬	⑧	See section "Programming loops" p. 54
Temperature increment ΔT (℃)	⑨	⑨ ΔT	See section "Programming a temperature increment" p. 55
Time increment Δt (s)	⑩	⑩ Δt	See section "Programming a time increment" p. 55
Heating rate ΔR (℃/s)	⑪	⑪ !	See section "Adjusting the ramp rate" p. 56
Gradient	⑭	⑭	See section "Programming a gradient step" p. 56
Step options (go to, temperature increment, time increment and heating rate)		⑮	

If a program has more than 6 steps, use the cursor keys to navigate in the spreadsheet or the graphical display.

7.2   Creating a new program/using a program template

Note: Only when the right **Write/delete own programs** is activated,

- users can create new programs

- users can edit existing programs

- users can delete programs

Enable a user to edit or delete his own programs	

Only when right **Write/delete All programs** is activated, users can edit programs created by other users.

1. To create a new program or open a program template, first log in as an existing user.

2. After login press the **Program** button in the home screen.

Program	

The program overview screen opens:

Fig. 24   Program overview screen

3. In the program overview screen, press the **New from template** button:

New from template	

4. The program template screen opens (see Fig. 26). Search for a program template using the cursor keys and press the corresponding button to select it.

Up	⌃
Down	⌄

Note: The Biometra TAdvanced offers several program templates for different purposes. You can either use a template and modify it as desired or select the option **Blank**. **Blank** is a program with no predefined steps (see Fig. 25).

Spreadsheet programming

Graphical programming

Fig. 25   Blank program template

Select **Blank** whenever a new program should be created and select another template from the list whenever an existing program should be edited.

The program structure can be controlled in the program preview (see Fig. 26). If a template is selected, the program steps and some additional information are displayed in spreadsheet form. By using the program preview function, templates can be checked before they are opened.

5. To open a program template, press the **Open template** button.

Open template	
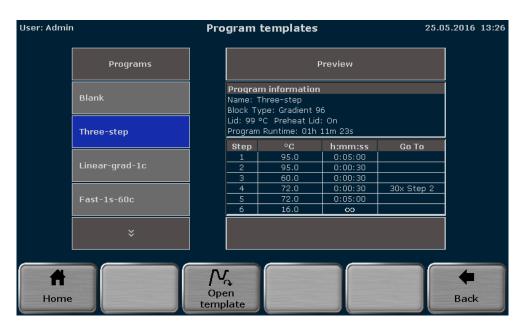
Fig. 26   Program template screen

7.3   Assigning program names

Each template has a specific name which is superimposed in the programming screen. To enter a name, touch the **Name** input field and enter a new name using the Biometra TAdvanced keyboard.

Note: If a character is pressed, the pre-displayed name will be deleted and a new program name can be set. If the program name should be modified, please first press another button like delete or space.

7.4   Setting the heated lid temperature

To set the heated lid temperature, touch the **Lid** input field. A small window opens in the middle of the screen with a keyboard (see Fig. 27). Enter a value between 30 and 110 using the Biometra TAdvanced keyboard.

Note: The default setting for the heated lid temperature is 99 ℃. 99 ℃ is sufficient for typical PCR programs.

Use the corresponding buttons to switch the heated lid on or off.
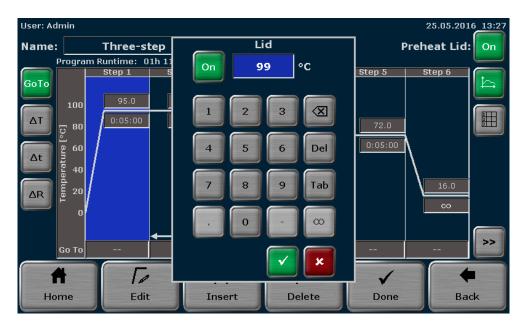
Fig. 27   Heated lid temperature setting screen

NOTICE

The heated lid automatically switches off at a temperature difference of >75 °C between the block and the heated lid. At these low block temperatures, sample condensation on the tube lid is no longer to be expected. In addition, it supports a longer service life of the Peltier elements in the block, since no unnecessary cooling against the heating cover is required.

7.5   Preheating the heated lid

The heated lid can be set to preheating ON or OFF using the corresponding buttons:

Preheat heated lid Off	Off
Preheat heated lid On	On

If the preheating mode is activated, the heated lid is first heated up to the programmed temperature while the sample block is held constant at 25°C. After the heated lid reaches the target temperature, a 40 second equilibration phase follows. Then the sample block starts to heat up from 25°C to the first programmed target temperature.

Note: For most applications it is recommendable to set the preheating mode to "ON".

7.6   Editing steps

When editing program steps, the following parameters can be entered in the Biometra TAdvanced software:

Parameter	Description and limits
Temperature	Temperature for a step in ℃. The target temperature can be set between 3.0℃ and 99.0℃ in tenths of a degree.
Hold time	Hold time for a step in h:mm:ss. Values between 0 and 9 hours, 0 and 59 minutes and 0 to 59 seconds can be programmed. To program a pause and set the hold time to infinite, enter ∞ in one of the input fields for h:mm:ss.
Go To	Defines the step number to which the program returns.
Cycles	Defines the number of repetitions. The maximum number of repetitions is 999.
△T	Temperature increment by which the target temperature is increased or decreased with each cycle. The temperature increment can be ± 20.0℃.
△t	Time increment (e.g., for long range PCR) by which the time is increased with each cycle. The time increment can be between 0s and 240s.
△R	Average heating and cooling rate between steps. The heating and cooling rate can be set from 0.1℃/s to max. in tenths of a degree. (The maximum ramp rate is sample bock specific). The ramp rate specifies the speed at which the selected step is reached with. It is possible that in some models this display may show a slightly higher maximum ramping rate than is achieved according to the technical specifications of the device. This is technically justified and achieves optimum control of the maximum value. In fact, the maximum heating and cooling rate is achieved as specified in the technical specifications.
Grad	Establishes a temperature gradient across the sample block. The maximum gradient temperature range and the temperature range that can be used for the gradient will depend on the installed sample block.

The Biometra TAdvanced offers two options for editing a step in a PCR program:

- Change all parameters for a step on a screen
- Change individual parameters directly in the spreadsheet or graphical display

7.6.1   Editing all parameters of a step

1. Activate a step in the spreadsheet or graphical view (see section "Programming modes" p. 47).

2. To edit the activated step, press the **Edit** button.

Edit	

In the graphical view you can also access the screen for editing a program step by touching the currently activated step again.
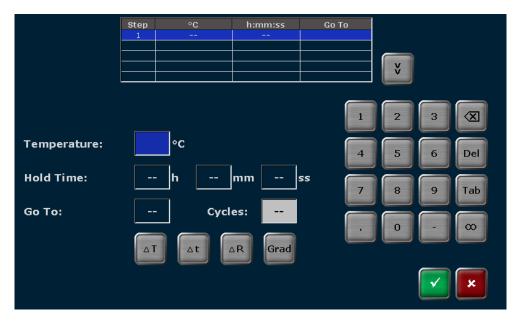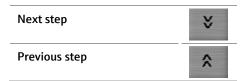
Fig. 28   Program step editing screen

Note: To program a step at least the temperature and the hold time must be defined.

3. To set the temperature, touch the corresponding input field and enter a value between 3.0°C and 99.0°C. Use the **tab** button or activate the next input field and enter a hold time in **h:mm:ss**.

    The Biometra TAdvanced software allows several program steps to be programmed subsequently (Multi Step Programming).

4. Use the cursor keys to navigate between program steps.

Next step	⌄⌄
Previous step	⌃⌃

    The currently activated step is highlighted in blue in the table above the input fields (see Fig. 28 on page 52).

Note: By navigating between program steps it is not necessary to confirm the settings for each single parameter or step and to leave the screen for editing program steps. Instead, you can fill in the parameters for all steps subsequently and confirm your entries after all steps are programmed.

7.6.1.1 Programming loops

A typical PCR program consists of repetitive steps for denaturation, annealing and extension. For the repetition of steps the Biometra TAdvanced software allows the programming of loops. For a loop two parameters have to be set:

■ The step number to which the program should return (**Go To**)

■ The number of repetitions (**Cycles**)

1. To program a loop, select the last step of the loop and enter the step number to which the program should return in the **Go To** input field (see Fig. 28).

2. To define the number of repetitions, enter a number in the **Cycles** field
   (see Fig. 28).

For example, to program the loop for the following protocol, select step **4** and enter the
value 2 in the **Go To** input field and the value 35 in the **Cycles** input field.

Loops	Step	Block Temp. (°C)	Hold Time (h:mm:ss)	Go To	Cycles
	1	95.0	0:05:00	--	--
35x	2	95.0	0:00:30	--	--
	3	60.0	0:00:30	--	--
	4	72.0	0:00:30	2	35
	5	72.0	0:05:00	--	--
	6	16.0	∞	--	--

Fig. 29   PCR program with a loop

In this example, the device first executes steps 1 to 4, then repeats step 2 to step 4 for
34 times, performs the final extension at 72°C and holds the temperature indefinitely at
16°C in the last step.

7.6.1.2 Programming a temperature increment

For some applications, for example touch down PCR, temperature increments are used.
The target temperature is increased or decreased in each cycle by the set value.

- To program a temperature increment, touch the ΔT button (see Fig. 28) and enter a
  value between +20°C and -20°C in the corresponding input field.

Temperature increment (ΔT)	ΔT

Note: Programmed temperature increments only become active if they are in loops. If a
temperature increment has been programmed, the small symbol ΔT will be shown at
the corresponding step in the graphical programming mode.

7.6.1.3 Programming a time increment

For some applications, for example long range PCR, time increments are used. The time
is increased in each cycle by the set value.

- To program a time increment, touch the Δt button (see Fig. 28) and enter a value
  between 0 s and 240 s in the corresponding input field.

Time increment (Δt)	

Note: Time increments only become active if they are in loops. If a time increment has been programmed, the small symbol will be shown at the corresponding step in the graphical programming mode.

7.6.1.4 Adjusting the ramp rate

The average ramp rate can be adjusted for each step. This adjustment can be useful if PCR programs are transferred from slower devices to the Biometra TAdvanced or for special PCR applications, for example, telomerase PCR. The average ramp rate specifies the speed at which the selected step is reached with.

- To adjust the ramp, press the following button (see Fig. 28):

Ramp rate (ΔR)	

- Then enter a value between 0.1℃/s and max. in tenths of degree Celsius.

- It is also possible that the entered ramp rate is applied to all steps in the PCR program. For this the checkbox **Apply Rampp Rate to all steps** must be activated.

Note: The maximum average ramp rate depends on the sample block installed in the Biometra TAdvanced. If the ramp rate has been adjusted, the small symbol will be shown at the corresponding step in the graphical programming mode.

7.6.1.5 Programming a gradient step

For Biometra TAdvanced monoblock models

Note: To be able to use the gradient function, the sample block needs to be gradient enabled.

The gradient function is most often used to optimize new primer pairs. A temperature gradient is established across the sample block in the annealing step so that there are different temperatures from column to column:

Fig. 30   Temperature gradient on a 96 well sample block

In a specific column all wells have the same temperature but the temperature differs from column to column. The temperature gradient can be applied in both directions; the highest temperature can be either in column 1 or column 12.

Sample replicates are distributed across the columns of the sample block and tested for the temperature giving the optimal result. To program a gradient step press the following key (see Fig. 28)

Gradient	Grad

There are two options to program a gradient. To toggle between the two options, press the corresponding button on the Biometra TAdvanced gradient programming screen (see Fig. 31):

Linear Gradient Tool	Lin.
Standard Gradient Programming	Std.

To program a gradient using the Linear Gradient Tool, enter the desired annealing temperature (**Annealing Temp.**) and define a temperature increment (**Grad incr.**) between the individual columns of the sample block. The effective temperatures for all the other columns are automatically calculated and displayed as a bar chart (see Fig. 31).

Note: The annealing temperature is set for a specific column in the sample block. For example, the annealing temperature in a 96 well sample block corresponds to the temperature in column 6. The column number is indicated in parenthesis next to the corresponding input field (see Fig. 31).

When setting a positive increment, the temperature in column 1 is the lowest and the temperature in column 12 is the highest. Use the minus button to enter a negative increment. When a negative value is used, the temperature in column 1 is the highest and the temperature in column 12 is the lowest.

Fig. 31   Linear Gradient Tool screen (Biometra TAdvanced Mono)

To create a gradient using the standard gradient programming screen, enter a temperature for the first column and the last column in the sample block (see Fig. 32). The effective temperatures for all the other columns are automatically calculated and displayed as a bar chart.
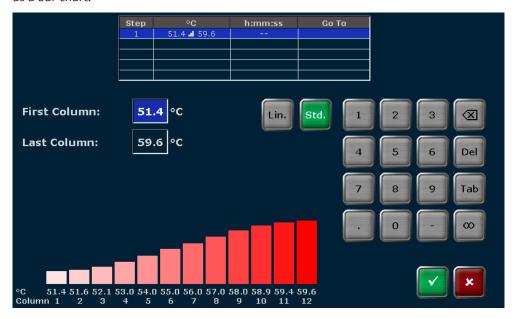
Fig. 32   Standard gradient programming screen (Biometra TAdvanced Mono)

For Biometra TAdvanced twinblock models

Note: To be able to use the gradient function, the sample block needs to be gradient enabled. For Biometra TAdvanced Twin 48 G this is the left block.

The gradient function is most often used to optimize new primer pairs. A temperature gradient is established across the sample block in the annealing step so that there are different temperatures from line to line:
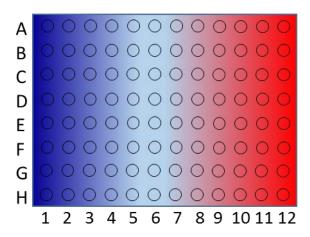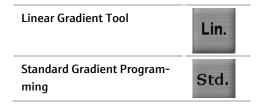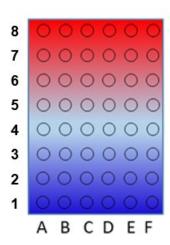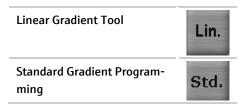
Fig. 33   Temperature gradient on a 48 well sample block

In a specific line all wells have the same temperature but the temperature differs from line to line. The temperature gradient can be applied in both directions; the highest temperature can be either in line 1 or line 8.

Sample replicates are distributed across the lines of the sample block and tested for the temperature giving the optimal result. To program a gradient step press the following key (see Fig. 28)

Gradient	Grad

There are two options to program a gradient. To toggle between the two options, press the corresponding button on the Biometra TAdvanced gradient programming screen (see Fig. 31):

Linear Gradient Tool	Lin.
Standard Gradient Program-ming	Std.

To program a gradient using the Linear Gradient Tool, enter the desired annealing temperature (**Annealing Temp.**) and define a temperature increment (**Grad incr.**) between the individual lines of the sample block. The effective temperatures for all the other lines are automatically calculated and displayed as a bar chart (see Fig. 34).

Note: The annealing temperature is set for a specific line in the sample block. For example, the annealing temperature in a 48 well Twinblock corresponds to the temperature in line 4. The line number is indicated in parenthesis next to the corresponding input field (see Fig. 34). When setting a positive increment, the temperature in line 1 is the lowest and the temperature in line 8 is the highest. Use the minus button to enter a negative increment. When a negative value is used, the temperature in line 1 is the highest and the temperature in line 8 is the lowest.
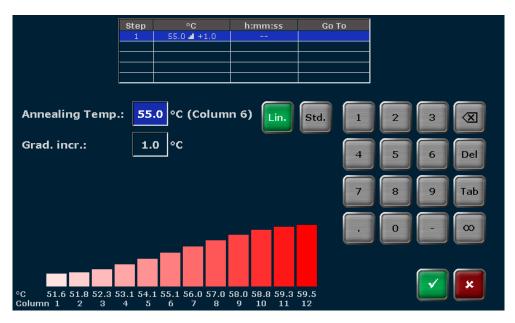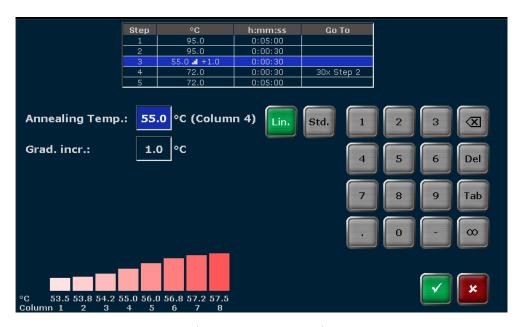
Fig. 34　　Linear Gradient Tool screen (Biometra TAdvanced Twin)

To create a gradient using the standard gradient programming screen, enter a temperature for the first line and the last line in the sample block (see Fig. 35). The effective temperatures for all the other lines are automatically calculated and displayed as a bar chart.
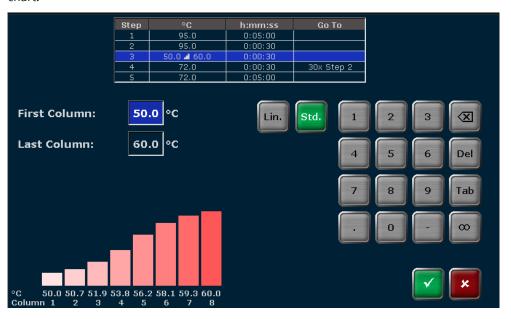

Fig. 35　　Standard gradient programming screen (Biometra TAdvanced Twin)

Note: Programs with gradient steps can only be started on blocks with gradient function. Please note that for twinblock models only the left block (block 1) features the gradient function. If you attempt to start a gradient program on a block without gradient function, the following message appears:

Fig. 36   Temperature gradient query

7.6.2   Direct programming of program parameters for a step

The Biometra TAdvanced software allows individual parameters (temperature, hold time, loops, temperature and time increment, as well as the ramp rate) for a step to be edited directly in the graphical or spreadsheet view.

To edit a parameter for a step, press directly on the cell for the program parameter in the table (see Fig. 37).

Fig. 37   Spreadsheet program view

Parameter	Spreadsheet view
Temperature (gradient) ℃	①
Hold time h:mm:ss	②
Loops	③
Number of cycles	④
Temperature increment ΔT (℃)	⑤
Time increment Δt (s)	⑥

Ramp rate ΔR (°C/s)	⑦

To edit program parameters in the graphical view, press the corresponding input field for the parameter that you want to edit for the step (see Fig. 38).

Program options (loops, temperature and time increment, as well as the ramp rate) must be activated using a button to the left of the graphical view (see Fig. 38). The loop setting is predefined.

The activated program option below the graphical view can then be edited by pressing the input field.
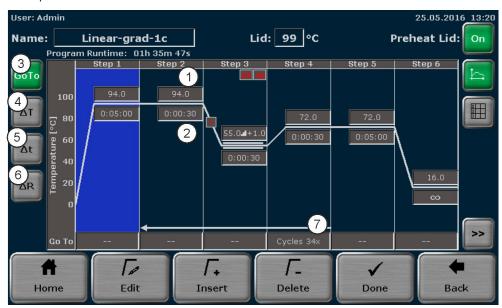
Fig. 38   Graphical program view

Parameter	Spreadsheet view
Temperature (gradient) °C input field	①
Hold time h:mm:ss input field	②
Loop counter option button	③
Temperature increment option button	④
Time increment option button	⑤
Ramp rate option button	⑥
Input field for program option (loop counter here)	⑦

When you press a cell in the spreadsheet view or an input field in the graphical view, a small window opens in the middle of the screen with a keyboard (see Fig. 39).

This window allows you to enter the desired value for the parameter using the keyboard.

Fig. 39   Individual program parameter editing

If the sample block is gradient-enabled, you also have the option of programming a gradient step.

To do this, when editing the temperature, press the **Grad** button.

Gradient	Grad

A gradient step can be programmed here (see Fig. 40).
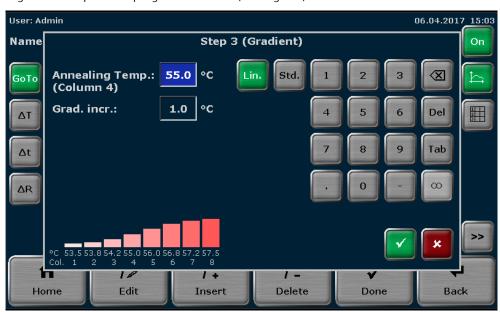
Fig. 40   Gradient view (Biometra TAdvanced Twin)

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7.7   Inserting a step

To insert a step, select a program step on the Biometra TAdvanced spreadsheet or graphical programming screen and press the **Insert** button.

Insert	

When you press the **Insert** button, the screen for editing program steps opens (see section "Editing steps" p. 52). Enter the desired parameters for the new step.

Note: The new step will be inserted at the selected program step. If, for example, step 3 is selected, the new step will be inserted at position 3. The existing step 3 is not overwritten; instead step 3 and all the following steps are moved one position higher. This means the existing step 3 becomes step 4, step 4 becomes step 5 and so on.

Note: If a new step is inserted in an existing loop, the number of steps within the loop increases, whereas the number of cycles remains the same.

7.8   Deleting a step

To delete a step, select a program step on the Biometra TAdvanced spreadsheet or graphical programming screen and press the **Delete** button.

Delete	

Note: If a step is deleted, all the following steps will be moved one position lower. If, for example, step 3 is deleted, step 4 will become step 3, step 5 will become step 4 and so on.

Note: If a step is deleted in an existing loop, the number of steps within the loop decreases, whereas the number of cycles remains the same.

7.9   Saving the program

To save a program, press the **Done** button.

Done	

On the Biometra TAdvanced spreadsheet or graphical programming screen. In the next program overview screen (see Fig. 41), touch the corresponding buttons to select a user directory and a program storage location.

If the number of user directories or programs is higher than the maximum number that can be displayed in the list, the buttons above and below the list can be used to scroll up and down.

Note: The user directory of the logged in user is automatically preselected.

Note: If a new program is to be saved, the first free storage location in the directory of the currently logged in user is automatically selected. However, the storage location can be changed using the cursor keys above and below the lists. If the selected storage location is already in use, the stored program will not be overwritten; instead this program and all other following programs will be moved one position higher. The storage location number for these programs will increase by +1 and the new program is saved at the selected location.

Fig. 41   Program overview screen

There is also the option of selecting a user directory or a program location using the quick select function.

Touch the icon above the user or program view (see Fig. 41).

Quick select function	

An overview screen opens in which a maximum of 50 users or 50 user programs are displayed. If more than 50 users are saved, scroll through the user list using the cursor keys. This is also true for more than 50 user programs (see Fig. 42).

Right	
Left	

To select a user or program, press the corresponding button with the user or program name. The user or the program will be selected and the program overview screen (see Fig. 41) appears again.

1.Three-step	11.Fast-1s-60c	21.Linear-grad-1c	31.Three-step	41.Linear-grad-1c
2.Fast-1s-60c	12.Linear-grad-1c	22.Three-step	32.Linear-grad-1c	42.Three-step
3.Three-step	13.Three-step	23.Fast-1s-60c	33.Three-step	43.Fast-1s-60c
4.Fast-1s-60c	14.Fast-1s-60c	24.Linear-grad-1c	34.Fast-1s-60c	44.Three-step
5.Linear-grad-1c	15.Linear-grad-1c	25.Three-step	35.Linear-grad-1c	45.Linear-grad-1c
6.Fast-1s-60c	16.Three-step	26.Fast-1s-60c	36.Three-step	46.Fast-1s-60c
7.Three-step	17.Fast-1s-60c	27.Linear-grad-1c	37.Fast-1s-60c	47.Linear-grad-1c
8.Fast-1s-60c	18.Linear-grad-1c	28.Linear-grad-1c	38.Linear-grad-1c	48.Three-step
9.Linear-grad-1c	19.Fast-1s-60c	29.Three-step	39.Three-step	49.Fast-1s-60c
10.Three-step	20.Three-step	30.Fast-1s-60c	40.Fast-1s-60c	50.Linear-grad-1c

Fig. 42   Quick selection screen

Before saving the program there is still the possibility of changing the program name.

To do this, press the **Save as** button and enter the new program name using the Biometra TAdvanced keyboard (see section "Assigning program names" p. 51).

Save as	

After selecting the user directory and the storage location and possibly changing the program name, press the **Save** button on the Biometra TAdvanced program overview screen (see Fig. 41) to save the program.

Save	

8   Starting, coping and deleting programs

8.1   Starting a program

Note: Programs can only be started by users with the right **Start/stop programs** activated (see section "Editing user settings" p. 102). Additionally the right **Read all programs** defines, if a user is allowed to read all programs or if the access is limited to own programs. A user who is not allowed to read all programs cannot start programs of others even if the right **Start/stop programs** is activated.

Enable a user to start or stop programs	**Start/stop programs**
Enable a user to read all programs of other users	**Read programs of other users**

The Biometra TAdvanced software offers a quick start function for previously started programs (see section "Quick start function" p. 39).

This section describes the process of selecting and starting stored programs from a user account. To select a program to be started, press the **Programs** button on the Biometra TAdvanced home screen (see section "Home screen" p. 37).

Programs	$\mathcal{N}$

The program overview screen opens with the directory of the logged in user preselected (see Fig. 43).

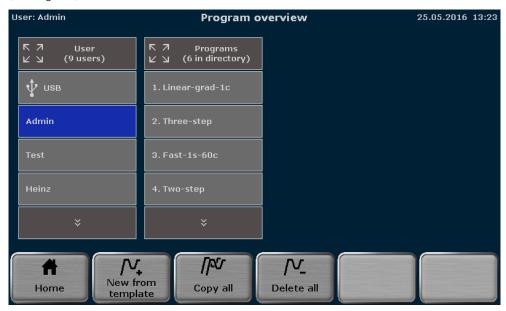**Fig. 43   Program overview screen**

Touch the corresponding buttons to select a user directory and a stored program. If the number of user directories or programs is higher than the maximum number that can be displayed in the list, the buttons above and below the lists can be used to scroll up and down.

There is also the option of selecting a user directory or a program location using the quick select function.

For the selected program a preview opens with general information on the program and the steps listed in a table (see Fig. 44). The program preview can be used to check the program before it is started. To start the selected program, press the **Start** button.

Start

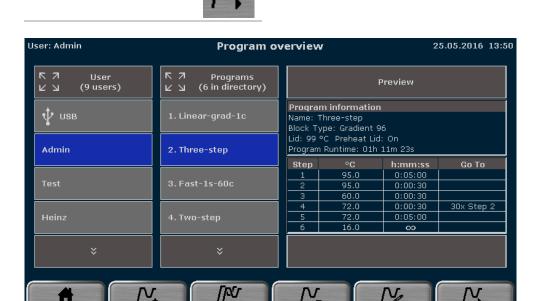**Fig. 44   Program overview screen with preview**

For twinblock models select the sample block to start and confirm your selection. The program will be started on the selected sample blocks.

Fig. 45   Twinblock selection query

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8.2   Copying a program

Note: Users can only copy and save their own programs when the right **Write/delete own programs** is activated. Programs of others can be copied and saved with the right **Write/delete all programs** activated (see section "Editing user settings" p. 102).

Enable a user to copy and save own programs	Write/delete own programs
Enable a user to copy and save all programs of other users	Write/delete programs of other users

To copy a program, touch the corresponding buttons to select a user directory and a program on the Biometra TAdvanced program overview screen (see Fig. 43 p. 67). If the number of user directories or programs is higher than the maximum number that can be displayed in the list, the buttons above and below the lists can be used to scroll up and down. To copy the selected program, press the **Copy** button.

Copy	

Touch the corresponding buttons to select a user directory and a storage location on the Biometra TAdvanced program overview screen (see Fig. 46). The program to be copied is highlighted in green. If the number of user directories or programs is higher than the maximum number that can be displayed in the list, the buttons above and below the lists can be used to scroll up and down. To save the selected program, press the **Save** button.

Save	

Note: If the selected storage location is already in use, the stored program will not be overwritten; instead this program and all other following programs will be moved one position higher. The storage location number for these programs will increase by +1 and the new program is saved at the selected location.

Fig. 46   Program overview screen

8.3   Copying all programs

Note: Users can only copy and save their own programs when the right **Write/delete own programs** is activated. Programs of others can be copied and saved with the right **Write/delete all programs** activated (see section "Editing user settings" p. 102).

Enable a user to copy and save own programs	Write/delete own programs
Enable a user to copy and save all programs of other users	Write/delete programs of other users

To copy all programs, touch the corresponding button to select a user directory on the Biometra TAdvanced program overview screen (see Fig. 43 p. 67). If the number of user directories or programs is higher than the maximum number that can be displayed in the list, the buttons above and below the lists can be used to scroll up and down. To copy all the programs, press the **Copy all** button.

Copy all	

Touch the corresponding button to select a user directory on the Biometra TAdvanced program overview screen (see Fig. 46 p. 70). If the number of user directories or programs is higher than the maximum number that can be displayed in the list, the buttons above and below the lists can be used to scroll up and down. To save the programs, press the **Save** button.

Save	

Note: The programs will be copied into the selected user directory beginning at the first free storage location.

Fig. 47   Program overview screen

8.4   Deleting a program

Note: Users can only delete their own programs when the right **Write/delete own programs** is activated. Programs of others can be deleted with the right **Write/delete all programs** activated (see section "Editing user settings" p. 102).

Enable a user to delete own programs	Write/delete own programs
Enable a user to copy and save all programs of other users	Write/delete programs of other users

To delete a program, touch the corresponding buttons to select a user directory and a program on the Biometra TAdvanced program overview screen (see Fig. 43 p. 67). If the number of user directories or programs is higher than the maximum number that can be displayed in the list, the buttons above and below the lists can be used to scroll up and down. To delete the selected program, press the **Delete** button.

Delete	⁁⁃

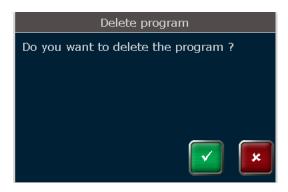Confirm the confirmation prompt to delete the program.

Fig. 48   Confirmation prompt

Note: If a program is deleted, all the following programs will be moved one storage location lower. The storage location number for these programs will decrease by -1.

8.5   Deleting all programs

Note: Users can only delete their own programs when the right **Write/delete own programs** is activated. Programs of others can be deleted with the right **Write/delete all programs** activated (see section "Editing user settings" p. 102).

Enable a user to delete own programs	Write/delete own programs
Enable a user to copy and save all programs of other users	Write/delete programs of other users

To delete all programs, touch the corresponding buttons to select a user directory on the Biometra TAdvanced program overview screen (see Fig. 43 p. 67). If the number of user directories is higher than the maximum number that can be displayed in the list, the buttons above and below the lists can be used to scroll up and down. To delete the programs, press **Delete all**.

Delete all	N-

Confirm the confirmation prompt to delete the programs.

Fig. 49   Confirmation prompt

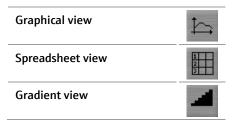# 9   Running, pausing, continuing and stopping programs

Biometra TAdvanced Twin   To switch the display of the sample blocks during a run press the button with the number of the corresponding sample block.

Sample block 1	**1**
Sample block 2	**2**

9.1   Display during a run

After a program has been started (see section "Starting a program" p. 67) the Biometra TAdvanced software can display the currently running program in a spreadsheet or graphical view. In addition, the curve of the gradient can be displayed in gradient steps. Use the following buttons to toggle between the different views.

Graphical view	
Spreadsheet view	
Gradient view	

Biometra TAdvanced Mono

Fig. 50   Graphical view

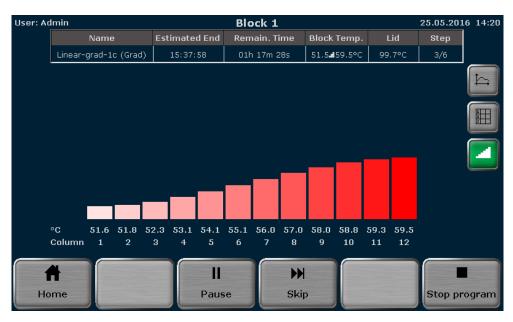**Fig. 51   Spreadsheet view**

Fig. 52   Display during the run in a graphical, spreadsheet and gradient view

Biometra TAdvanced Twin

Fig. 53   Graphical view
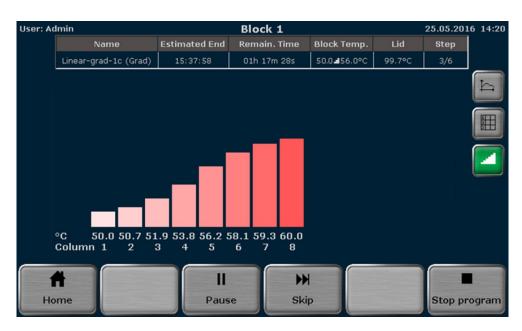

Fig. 54   Spreadsheet view

Fig. 55   Display during the run in a graphical, spreadsheet and gradient view

The following parameters are summarized in the headline in the table:

- Program name

- Sample block temperature

- Estimated end

- Heated lid temperature

- Remaining runtime

- Sequential number of working step

If the heated lid is set to preheating **On** (see section "Preheating the heated lid" p. 52), during the preheating of the heated lid the word "Preheat" will be displayed in the **Step** field in the table. After the heated lid has reached the target temperature and the 40s equilibration phase has passed, the first program step starts. During the program run, the current step is highlighted in yellow in the graphical and spreadsheet view. In the graphical view, each step is divided into a heating phase and a hold time and both parts are highlighted separately. Time and temperature increments and ramp rate adjustments cannot be shown in the graphical view. Instead the symbols ΔT, Δt or ! are displayed (see section "Programming modes" p. 47).

If it is a gradient program, **Grad** is also displayed in brackets in the **Name** field after the program name (for example see Fig. 52).

During a gradient step, the temperatures present in each individual column in the sample block can be checked in the gradient display.

9.2   Pausing a program

To pause a program, press the **Pause** button on the Biometra TAdvanced run display screen (see Fig. 52 p. 47).

Pause

The word "Pause" is shown and the pause time is counted in the **Remain. Time** field.

Biometra TAdvanced
Mono

Fig. 56   Spreadsheet view

Fig. 57   Display screen during a program pause (graphical view)

Biometra TAdvanced Twin

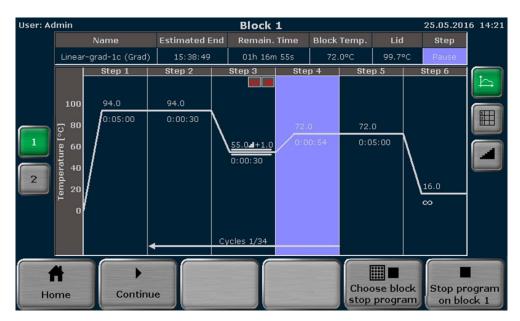

Fig. 58   Spreadsheet view

Fig. 59   Display screen during a program pause (graphical view)

Note: Pressing the **Pause** button requires manual interaction. The Biometra TAdvanced software also allows pauses to be programmed (see section "Editing steps" p. 52), then the pause step is automatically started by the device.

Note: If the device is switched off during a pause step, this will be recognized as a power failure (a corresponding error message is written to the run log file). If, for example, the last step in a program is a pause, the program has to be stopped by pressing the **Stop** button (see section "Stopping the program" p. 80), before switching off the Biometra TAdvanced.

9.3   Continuing the program

To continue a paused program, press the **Continue** button on the Biometra TAdvanced run display screen (see Fig. 57 p. 78).

Continue	▶

The Biometra TAdvanced will continue the program from exactly the point at which it was paused.

9.4   Skipping a step

To skip a program step, press the **Skip** button on the Biometra TAdvanced run display screen (see Fig. 52 p. 75).

Skip	▶▶❙

The Biometra TAdvanced will continue with the next program step and skip the current step.

9.5   Stopping the program

Note: Programs can only be stopped by users with the right **Start/stop programs** activated (see section "Editing user settings" p. 102).

Enable a user to stop programs	Start/stop programs

To stop a program, press the **Stop program** button on the Biometra TAdvanced run display screen (see Fig. 52).

Stop program	■

Confirm the confirmation prompt to stop the current program:
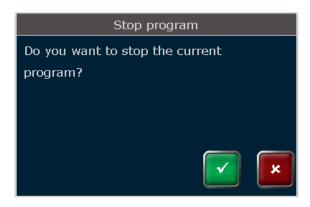
Fig. 60   Confirmation prompt

After confirmation of the confirmation prompt the Biometra TAdvanced stops the current program.

Biometra TAdvanced Twin   If two sample blocks are running the Biometra TAdvanced offers the option to stop only one block or to stop both blocks simultaneously. Therefore, press the following button:

block Stop

Activate the corresponding checkboxes to select the sample blocks to stop.

Fig. 61   Twinblock selection query

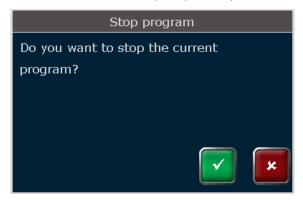Confirm the confirmation prompt to stop the current program:

Fig. 62   Confirmation prompt

After confirmation of the confirmation prompt the Biometra TAdvanced stops the program on the selected blocks.

10   Protocol Wizard

The protocol wizard is a helpful tool for automatic creation of PCR programs and primer annealing temperature calculation. To start the protocol wizard press the following button in the Biometra TAdvanced home screen (see section "Home screen" p. 37):

Protocol Wizard

10.1   Select Polymerase

The protocol wizard uses polymerase-specific program templates to create PCR programs. Program templates for up to 8 polymerases can be stored by the TAdvanced software.
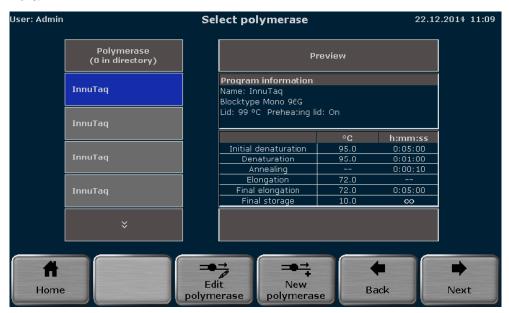

Fig. 63   Select polymerase screen

Pre-installed in the software is the program template for Analytik Jena Innupure polymerases. To create a PCR program select a polymerase from the list and press the **Next** button.
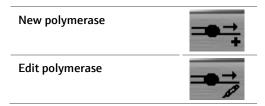
Next

In the next screen (see section "Enter a new polymerase or edit a polymerase" p. 83) enter values for the requested parameters to continue with the automatic program creation.

10.2   Enter a new polymerase or edit a polymerase

To enter program templates for new polymerases or to edit preset program templates for polymerases press the corresponding button:

New polymerase	
Edit polymerase	

In the next screen (see Fig. 64) touch the corresponding input boxes to enter a name for the polymerase and set parameters for all requested program steps. With two exceptions for most program steps the temperature and the hold time must be defined:

■   The temperature for the annealing step depends on the calculated primer melting temperature (T_m value) and has to be set individually for each primer pair (see section "Primer Annealing Temperature Calculator" p. 87).

■   The hold time for the elongation step becomes calculated by the expected product length.

The corresponding input boxes for the annealing temperature and elongation time are shown in grey and cannot be activated.
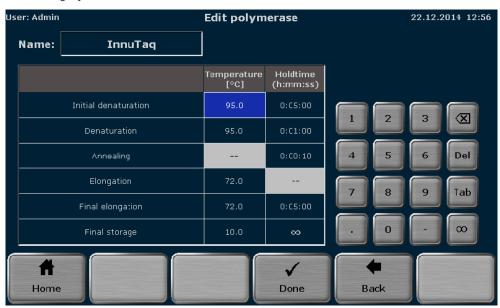

Fig. 64   Edit polymerase screen

After creating the program template for a new polymerase or editing the program template of a polymerase press the **done** button.

Done	

In the next screen (see Fig. 65) touch the corresponding button to select a storage place for the program template (polymerase). If the number of polymerases exceeds the

number of polymerases than can be displayed in the list, the cursor key function above and below the polymerase list can be used to scroll up and down.
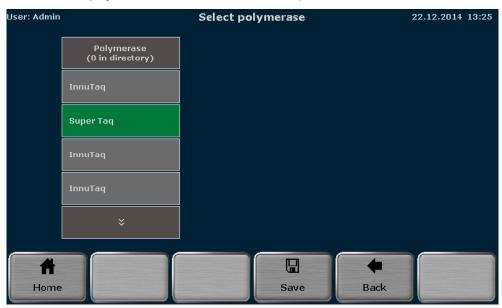

Fig. 65   Select polymerase screen

Note: If a new or edited polymerase is to be saved, the first free storage place in the polymerase list is pre-selected. However, the storage place can be modified by using the cursor key function above and below the list.

To save the new or edited polymerase press the **save** button.

Save	

Note: If the selected storage place is already in use, the stored polymerase will be overwritten. Confirm the security query to overwrite the existing polymerase:
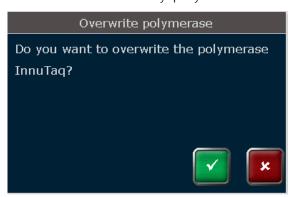

Fig. 66   Security query

10.3   Delete a polymerase

To delete a polymerase press the **delete** button.

Delete Polymerase	

Note: The Template **InnuTaq** cannot be deleted.

10.4   Protocol Wizard parameter screen

For automatic calculation of PCR programs in the protocol wizard parameter screen (see Fig. 67) some parameters have to be set by the user:

1. Touch the corresponding checkbox to select between two step and three step programs.

   Note: The protocol wizard offers to create two step or three step PCR programs. A three step program consists of separated steps for denaturation, annealing and extension. In a two-step program the annealing and extension steps are combined to one single step. In consequence for a three step protocol different temperatures for the annealing and extension steps are used and for a two-step program the primer annealing temperature T_a (see below) is used for the annealing and extension step.

2. Enter the PCR product length.

   Note: The product length is used by the software to calculate the elongation time. The software uses the following equation:

   Elongation time s = product length bases/1000 bases*60 s

   For very short products the minimum elongation time is set to 6 s.

3. Enter the primer annealing temperature

   Note: In general the annealing temperature (T_a) should be set approximately 5 ℃ below the calculated mean primer pair melting temperature (T_m). The theoretical T_a value can also be calculated by the Biometra TAdvanced protocol wizard ("Primer Annealing Temperature Calculator" p. 87).

4. Enter the number of cycles.

For gradient enabled TAdvanced models

5. Optional: To define a temperature gradient for the annealing step press the **Grad** button.

Delete Polymerase	

An additional input box **Grad. incr.** opens. Set the value for the temperature gradient increment. For more information on the gradient temperature increment see section "Editing steps" p. 52.

6. To set the parameters touch the corresponding field in the protocol wizard parameter screen and enter the desired values.

Fig. 67   Protocol wizard parameter screen

7. After setting all program parameters press the **Next** button.

| **Next** | |

The next screen lists the all steps of the program that will be created by the software:

Fig. 68   Protocol wizard view parameter screen

Press the **create program** button to enter the TAdvanced programming screen (see section "Creating, editing and saving programs" p. 47). In the programming screen the program is displayed in graphical or spreadsheet mode and can be edited. To save the program created by the protocol wizard follow the instructions in section "Saving the program" p. 64.

Create program	

Note: Programs have to be saved before they can be started. If the program has been created but should not be saved confirm the following security query to discard the program:
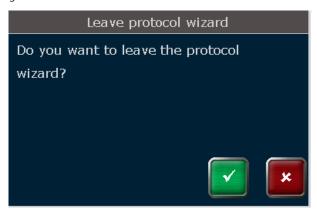

Fig. 69   Security query

10.5   Primer Annealing Temperature Calculator

Based on the primer sequences the Biometra TAdvanced protocol wizard can calculate the theoretical primer annealing temperature (T_a). Press the **Calc T_a** button in the TAdvanced protocol wizard parameter screen (see Fig. 67 p. 86) to access the primer annealing temperature calculator screen (see Fig. 70).

Calc T_a	

In the annealing temperature calculator screen enter the sequences for the forward and reverse primer using the button below the input fields. The sequence length is counted by the software and displayed in brackets left to the input fields.
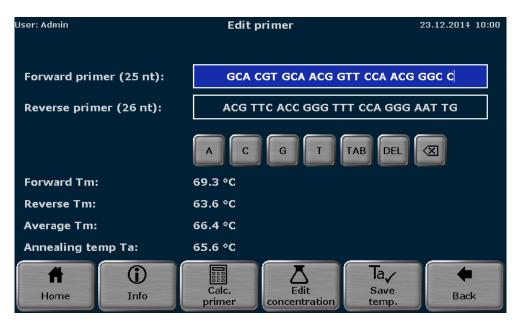
Fig. 70   Primer annealing temperature calculator screen

To adjust the primer or salt concentration press the **Edit concentration** button.

Edit concentration

In the next screen the primer concentration, salt concentration and magnesium concentration can be adjusted. Touch the corresponding input field and enter values using the keypad. The concentrations have the following default values and ranges:

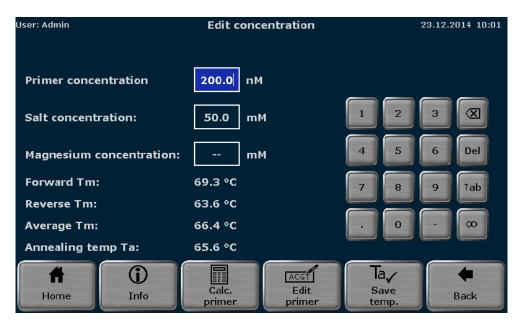| Function	Default value	Range
Primer concentration	200 nmol/l (nM)	0-2.000 nmol/l
Salt concentration	50 mmol/l (mM)	0-200 mmol/l
Magnesium concentration	0 mmol/l (mM)	0-200 mmol/l

Fig. 71   Edit primer concentration screen

Press the **Edit primer** button to toggle to the primer annealing temperature calculator screen (see Fig. 70) or press the **Calc. primer** button to calculate the theoretical primer annealing temperature (T_a).

Edit Primer	
Calc. primer	

The calculated values for the forward primer melting temperature (T_m), reverse primer melting temperature (T_m), mean primer melting temperature (T_m) and calculated annealing temperature (T_a) are displayed.

Press the **Save temp.** button to transfer the calculated primer annealing temperature to the protocol wizard (see Fig. 67 p. 86). The calculated T_a value will be displayed in the input box for the primer annealing temperature.

Save temp.	

Press the **Info** button to get information on the algorithms used for annealing temperature calculations.

Info	

For short sequences of 14 nucleotides or less the software calculates the primer annealing temperature (T_a) based on the primer T_m values as follows:

1. For each primer the melting temperature is calculated using the following equation according to Wallace et al. (1):

   $T_m = ((w*A + x*T)*2) + ((y*G + z*C)*4)$

Where w, x, y and z are the number of the bases A, T, G and C in the primer sequence, respectively.

2. The average T_m value is calculated from the T_m values for both primer sequences.

3. The annealing temperature T_a is calculated based on the average T_m value by applying the following rules:

   ■ If the difference between the primer T_m values is 4 ℃ or less, the T_a is calculated as the average T_m value minus 5 ℃.

   ■ If the difference between the primer T_m values is higher than 4 ℃, the T_a is calculated as the lower T_m value plus 2 ℃.

For long primer sequences of 15 nucleotides or more the software calculates the primer annealing temperature (T_a) based on the nearest neighbor method according to SantaLucia (2) and von Ahsen et al. (3).

1   Wallace et al., Nucleic Acids Res. 6, 3543, 1979
2   SantaLucia, Proc Natl Acad Sci U S A. 1998 Feb 17;95(4):1460-5
3   von Ahsen et al., Clin Chem. 1999 Dec;45(12):2094-101

11   Tools

The Biometra TAdvanced software provides the following tools:

Settings	Defines basic device settings	See section "Configuration" p. 91
User Management	Tool for user management	See section "User management" p. 99
Documentation	Access to stored log files	See section "Documentation" p. 105
Self Test	Executes the extended self-test	See section "Extended self-test" p. 111
Service info file	Creates service info files (SINF)	See section "Service info file (SINF)" p. 114
Backup	Saves all folders, programs, users and user rights to USB	See section "Backup" p. 114
Cycler Info	General information on the device	See section "Cycler Info" p. 115
Contact	Biometra contact data	See section "Contact" p. 116

Fig. 72   Tools screen

Press the corresponding button to access the desired function.

11.1   Configuration

Note: System settings can only be modified by users with the right **System configuration** activated (see section "Editing user settings" p. 102). The system configuration affects all functions listed below expect of the user management.

Enable a user to configure the system configuration	**System configuration**

The Biometra TAdvanced software offers the following setting options:

|		
Date and time	Sets the date and time	See section "Setting the date and time" p. 92
Automatic user logout	Switches automatic user logout on or off and time settings	See section "Automatic user logout" p. 93
Beeper	Switches the beeper on or off	See section "Configuring the beeper" p. 94
Network	Defines network settings	See section "Network" p. 95
Display brightness	Adjusts the display brightness	See section "Display brightness" p. 97
Touch screen calibration	Calibrates the touchscreen	See section "Screen calibration" p. 98
Factory settings	Resets all the settings	See section "Factory settings" p. 98
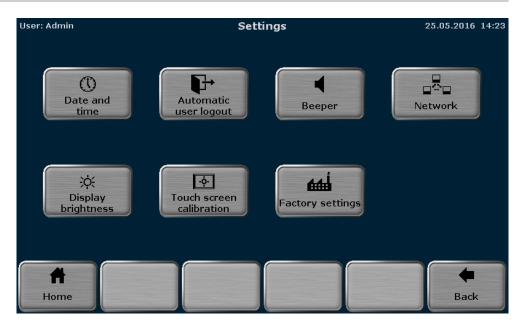
Fig. 73   Settings screen

Press the corresponding button to access the desired function.

11.1.1 Setting the date and time

The Biometra TAdvanced software allows the user to set the date and time. The date has the format **day:month:year** and the time the format **hours:minutes:seconds**.
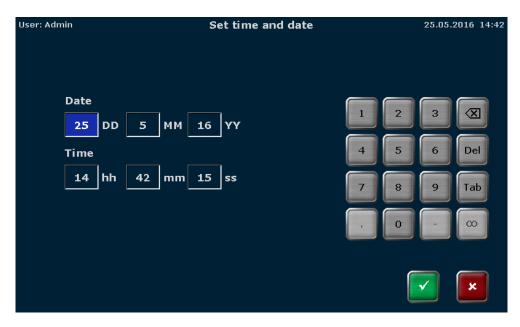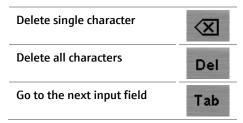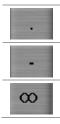
Fig. 74   Date and time entry screen

Activate the corresponding input field and use the keypad on the right side of the date and time entry screen to enter digits. The following buttons may also be helpful when completing the fields:

Delete single character	
Delete all characters	
Go to the next input field	

Note: The following buttons are inactive on the date and time entry screen and cannot be used:

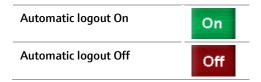

11.1.2 Automatic user logout

Note: The automatic user logout can only be configured by users with the right **System configuration** activated (see section "Editing user settings" p. 102).

Enable a user to configure the system configuration	

The Biometra TAdvanced features an automatic user logout function. The automatic user logout can be switched **On** or **Off** by using the corresponding button:

Automatic logout On	On
Automatic logout Off	Off

If automatic user logout is switched on, the time after which the user is logged out from the system can be set. You can enter values between 30 and 60 minutes.
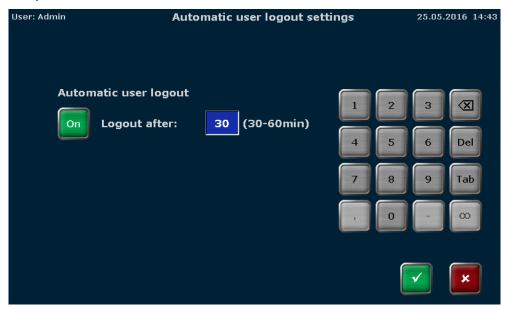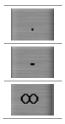

Fig. 75   Automatic user logout screen

Note: The standard setting is automatic user logout **Off**.

Note: The following buttons are inactive on the automatic user logout screen and cannot be used:

11.1.3 Configuring the beeper

Note: The beeper can only be configured by users with the right **System configuration** activated (see section "Editing user settings" p. 102).

Enable a user to configure the system configuration	System configuration

The Biometra TAdvanced has a beeper which, if switched on, will issue an acoustic signal when a PCR program is finished. The beeper can be switched ON or OFF by activating the corresponding checkbox.

Fig. 76   Beeper configuration screen

11.1.4 Network

The **Network** menu item can be used to configure basic settings or show a list of network users. Press the corresponding button

Network settings	
Network user	

Network settings

Note: The network settings can only be configured by users with the right **System configuration** activated (see section "Editing user settings" p. 102).

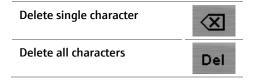|	
Enable a user to configure the system configuration	**System configuration**

The Biometra TAdvanced can handle static and dynamic IP addresses. Activate the corresponding checkbox to choose between dynamic (DHCP) and static IP address management.

If DHCP (Fig. 78) is activated, the device automatically receives the network configuration settings. If the static checkbox is activated, you can enter the IP address and the subnet mask using the keypad on the right side of the screen.
The port number can entered manually in both setting types (static and DHCP).

The following buttons may be helpful when completing the fields:

Delete single character	
Delete all characters	**Del**

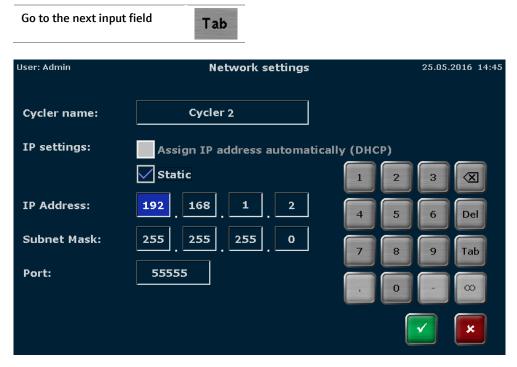| Go to the next input field	Tab

Fig. 77   Network settings screen, IP settings via static
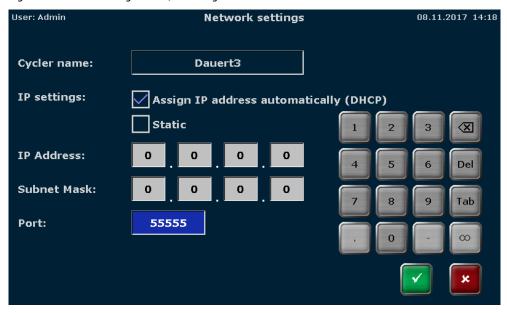

Fig. 78   Network settings screen, IP settings via DHCP

Note: The network cable must be at least performance class Cat 5e and the cable configuration has to be STP.

Network users | The software stores the users who access the Biometra TAdvanced via the network and lists them in chronological order in a table. The function makes it possible to check if only authorized persons have network access to the device.

PCR control App | The app is available for iOS (Apple App Store) and Android (Google Play Store) driven systems.

The PCR Control App offers the following functions:

- Live monitoring of PCR runs on network-integrated thermal cyclers- Starting and stopping PCR protocols are stored on the thermal cycler

- Notification system for monitoring status changes on selected blocks of a thermal cycler

- Store PCR protocols on the terminal. This can be stored on a PC using a USB stick

- Copy PCR protocols from the terminal to a selected thermal cycler

- Read device-specific parameters
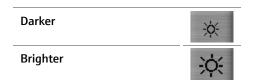
- Read out thermal cycler error messages

11.1.5 Display brightness

Note: The display settings can only be edited by users with the right **System configuration** activated (see section "Editing user settings" p. 102).

Enable a user to configure the system configuration	System configuration

The display brightness can be adjusted to the local light conditions. To adjust the display brightness, use the corresponding buttons or the slider:
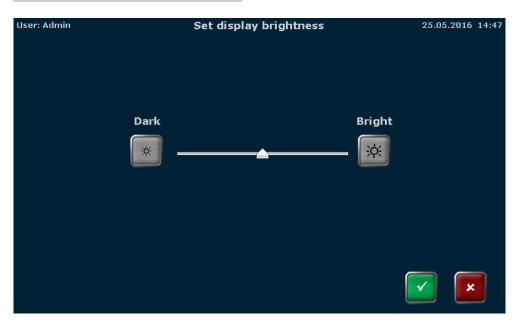
Darker	☼
Brighter	☼

Fig. 79   Display brightness adjustment screen

11.1.6 Screen calibration

Note: The touch screen can only be calibrated by users with the right **System configuration** activated (see section "Editing user settings" p. 102).

Enable a user to configure the system configuration	System configuration

To calibrate the screen, follow the instructions and touch the screen at the center of the displayed circle. This procedure is repeated three times at different positions on the display. If, at the end of the procedure, a small cross is shown within the large circle, the calibration was successful.

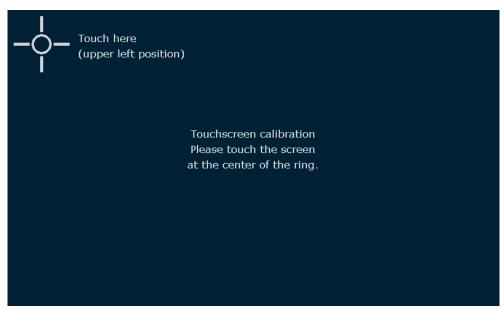**Fig. 80   Calibration screen**

11.1.7 Factory settings

Note: Factory settings can only be reset by users with the right **System configuration** activated (see section "Editing user settings" p. 102).

Enable a user to configure the system configuration	System configuration

Press the **Factory settings** button and confirm the following confirmation prompt:

Fig. 81   Confirmation prompt

Using the factory settings tool will delete all users and programs! Use a backup file to re-store the system (see section "Backup" p. 114).

11.2   User management

The Biometra TAdvanced can manage up to 90 user directories. User management allows new users to be created and user rights to be set. User management is a complex tool. Please observe the following guidelines:

1. The factory setting for the administrator password is **Admin**. Please change the password after switching on user management to protect the system from unwanted modifications.

2. Use the backup function to create backup files. Backup files can be used to restore a system or to synchronize the memory contents of Biometra TAdvanced thermal cyclers.

3. Do not switch off the user management if you are not absolutely sure. All rights settings will get lost and can only be restored if a backup file is available.

The user management can be switched on or off. To set the user management on or off press the **User Management** button in the Biometra TAdvanced user management screen (see Fig. 82).

User Management On/Off

Note: The **User Management** button is only available for the user group **Administrator.** Only an administrator can switch on or off the Biometra TAdvanced user management. Also with the user management switched off the administrator **Admin** has to log in.

Fig. 82   User management screen

In the next screen activate the corresponding checkbox to configure the Biometra TAd-vanced user management:
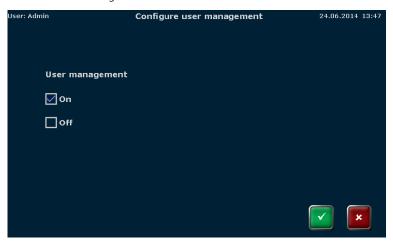

Fig. 83   Configure user management screen

If the user management is switched off, all new users have all rights and can access all software functions.

With the user management switched on, the Biometra TAdvanced Thermal Cycler sup-ports 3 different user groups with pre-defined rights:

	Administrator	User with generic rights	User with limited rights
System configuration	x		
Edit user	x		
Create user	x*	x*	
Delete user	x		

Write/delete all pro-grams	x		
Write/delete own pro-grams	x	x	
Read all programs	x	x	x
Start/stop programs	x	x	x
Show your own pro-grams to other users	x	x	x

* An administrator can create users of all groups and modify their rights settings. A user with generic rights is only allowed to create users with generic or limited rights but no administrator. In addition, the user with generic rights cannot modify the rights settings of other users.

The settings for each user can be modified by the administrator and will be stored by the Biometra TAdvanced software.

Note: If the user management is switched off, user accounts and programs are not protected and can be modified or deleted by all users.

Available users are listed on the Biometra TAdvanced user management screen (see Fig. 82) sorted by the date and time of the last login and the username, the initials and the group assignment are shown. Depending on the settings a user can be grouped as:

- Administrator
- User with generic rights
- User with limited rights
- User defined

If more than 8 users have been created, you can use the cursor keys to navigate through the table with the list of users (see Fig. 82).

Up	
Down	

To select a user, press on the corresponding row in the table.

11.2.1 Creating a user

Note: New users can only be created by users with the right **Create User** activated.

Enable a user to create a new user	

An administrator can create users of all groups and modify their rights settings. A user with generic rights is only allowed to create users with generic or limited rights but no administrator. In addition, the user with generic rights cannot modify the rights settings of other users.

To create a new user, press the **New User** button.

New user	

In the next screen enter the using the Biometra TAdvanced keyboard (see section "Keyboard" p. 28)

- **Username** (up to 13 characters or numbers)
- **Initials** (2 to 3 characters)
- **Password** (up to 13 characters, numbers or special characters)
- **Repeat password**

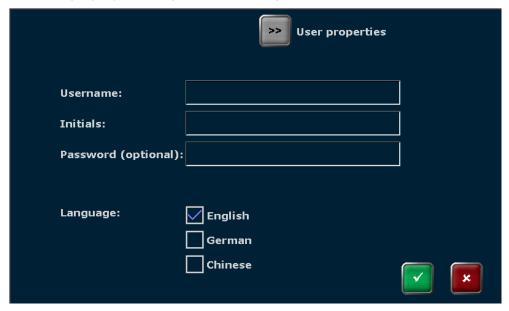Set the language by activating the corresponding checkbox.

Fig. 84   Create new user screen

Note: The password protection is optional. However, if no password is used, your account containing all of your programs might be modified or deleted by unauthorized persons.

Note: The language setting is user specific. For each user the language setting is saved by the device. The language setting can be changed during operation and the device does not need to be switched off and rebooted.

11.2.2 Editing user settings

Note: User rights can only be edited by users with the right **Edit User** activated.

Enable a user to edit user rights	Edit user

To edit the user settings, select a user on the Biometra TAdvanced user management screen (see Fig. 82 p. 100) and press the **Edit User Account** button.

Edit User Account	

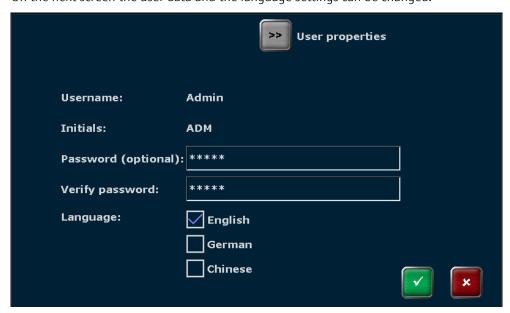On the next screen the user data and the language settings can be changed.

Fig. 85   User data screen

Note: For the administrator **Admin** the user name and the initials **ADM** cannot be modi-
fied. It is recommended to change the password for the administrator **Admin** after the
first system start and to create a backup of the system. Folders, programs, users and
rights settings can be restored from a backup file.

To modify the user rights press the **User properties** button.

User properties	>>

In the next screen the user can be defined as:

- Administrator

- User with generic rights

- User with limited rights

For each user group templates defining the user rights are available. However, the pre-
defined settings can be modified. You can activate or deactivate single rights. Activated
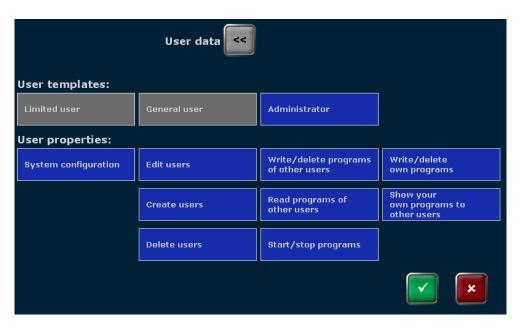rights are highlighted blue, deactivated rights are shown in grey.

Fig. 86   User properties screen

Right	Function
System configuration	Provides access to several system settings like date and time, screen saver, beeper, network settings, display brightness, touch screen calibration and factory settings
Edit user	Allows to modify the user name, user initials, password, language setting and user rights
Create user	Allows to create new user accounts. A user with generic rights can only create generic or limited users and is not allowed to modify the rights settings. An administrator is allowed to create all user types and to modify the rights settings for each user.
Delete user	Allows to delete existing user accounts
Write/delete programs of other users	Allows to edit/copy and delete all programs of all users
Read all programs of other users	If inactive the access is limited to own programs. Programs of others cannot be viewed (if a program cannot be viewed it also cannot be edited or started by the user).
Start/stop programs	Allows to start or stop programs
Write/delete own programs	Allows to edit/copy and delete own programs but not those of other users.
Show your own programs to other users	Allows users to hide their own programs from other users.

Note: The settings for the administrator **Admin** cannot be changed. The administrator always has all rights since at least one user needs to have all rights.

Press the **User data** button to go back to the user data screen (see Fig. 85 p. 103).

The settings for each user will be stored by the Biometra TAdvanced software and are shown in the user management screen.

11.2.3 Delete user

Note: User accounts can only be deleted by users with the right **Delete User** activated.

Enable a user to delete users	Delete user

To delete a user, select the user on the user management screen (see section "User management" p. 99) and press the **Delete User Account** button.

Delete User Account	

Note: The administrator **Admin** cannot be deleted because at least one user must be the administrator of the Biometra TAdvanced.
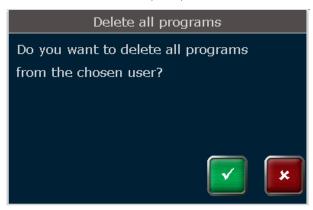
Confirm the confirmation prompt to delete the user:

Fig. 87   Confirmation prompt

After confirmation the user and all of his programs will be deleted.

11.3   Documentation

The Biometra TAdvanced software provides the following documentation tools:

Run Log File	Documentation of PCR runs	See section "Run log file" p. 106
Power On Log File	Result of the latest initial self-test	See section "Power On Logfile" p. 109
Self Test Log File	Result of the extended self-test	See section "Extended self-test log file p." 109
Error Log File	List of all the error messages detected by the device	See section "Error log file" p. 110

Fig. 88   Documentation screen

Press the corresponding button to access the desired function.

11.3.1 Run log file

The Biometra TAdvanced lists up to 24 run log files for the programs that were last started.

Fig. 89   Run log file overview screen

The run log files are sorted by date and time. The run log file for the program that was last started is shown at the first position in the table. The initials of the user who started the program, the number of the sample block being used, the program name, the directory and the program number are also shown.

If more than 6 run log files have been created, you can use the following cursor keys to navigate through the table with the run log files (see Fig. 89).

Up	⌃
Down	⌄

To view the collected data, select a run log file by activating the corresponding row in the table and press the **View Run Log File** button.

View Run Log File	

In the run log file screen the following information is listed:

- Name of the run log file
- Login time and date
- Start and end time of the program run
- Date of the program run
- Name of the vendor
- Software version
- User initials

- Cycler type
- Serial number of the Biometra TAdvanced thermal cycler
- Sample block type
- Block serial number
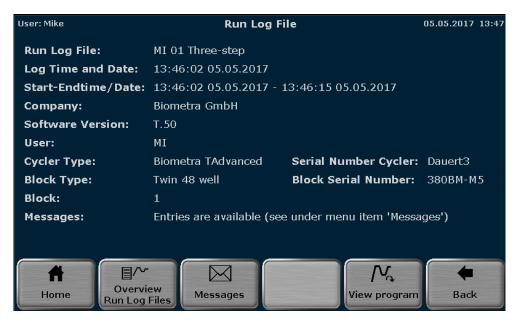- Block number
- Messages
- Cycler type

Fig. 90   Run log file screen

To view the corresponding program, press the **View Program** button.

View program	

The Biometra TAdvanced offers the option to show the program in graphical from or as a spreadsheet (see section "Programming modes" p. 47). To toggle between the graphical and spreadsheet view, use the buttons:
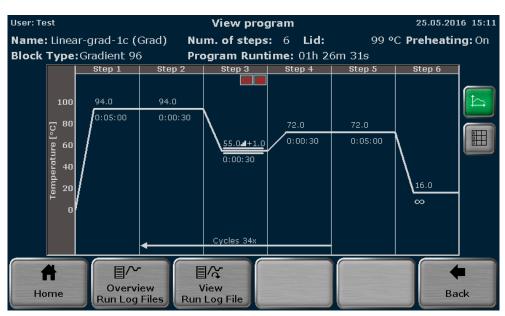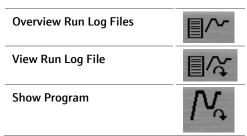
Graphical view	
Spreadsheet view	

Fig. 91   Program view screen

Use the buttons to toggle between the overview screen, the run log file screen and the view program screen.

Overview Run Log Files	
View Run Log File	
Show Program	

To export all the saved run log files on USB, press the **Save all Run Log Files on USB** button. To export a specific run log file, select a log file from the list on the run log file overview screen (see Fig. 89 p. 106) and press the **Save Run Log File on USB** button.

Save all Run Log Files on USB	
Save Run Log File on USB	

11.3.2 Power On Logfile

With each system start, the Biometra TAdvanced performs an initial self-test and stores the results in a power on logfile.

In the power on logfile screen the following information is listed:

- Power-on by date and time

- Last power-on by date and time

- Last power-down by date and time

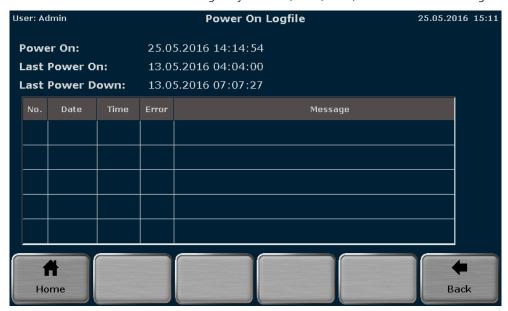- A table with a list of error messages by number, date, time, error code and message

Fig. 92   Power on log file screen

11.3.3 Extended self-test log file

During the extended self-test the Biometra TAdvanced checks several functions and components like cooler, thermal tracking, heating and cooling rate, refrigeration, gradient, heated lid and regulation (see section "Extended self-test" p. 111). Press on the corresponding button to see the results for a specific test summarized in spreadsheet form.
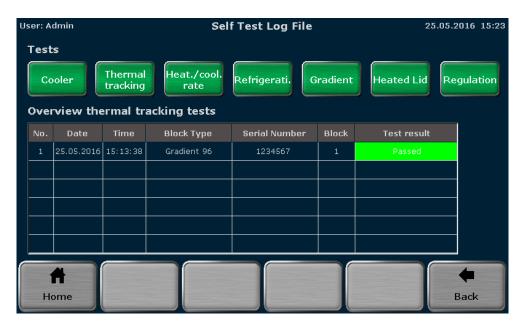
Fig. 93   Extended self-test log file screen

The test result can be **Passed** or **Failed** and is listed in the last row of the table for each test.

11.3.4 Error log file

The Biometra TAdvanced records all errors by date and time. The latest error is shown at the first position in the error table. The error code and the message are also listed.
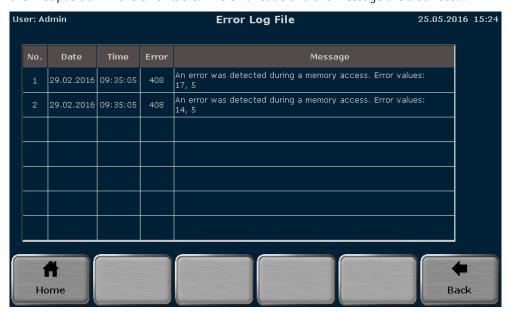

Fig. 94   Error log file screen

11.4   Extended self-test

NOTICE

The Extended Self-Test must be performed under the following conditions to achieve re-producible and meaningful results:

- Ambient temperature in the range 20 ℃ to 25 ℃

- Mains voltage depending on the voltage type of the device: 100 V/115 V/230 V, ±10 % each

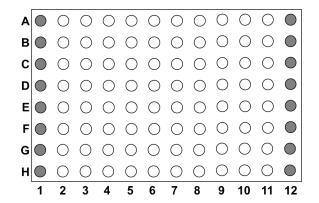- The device must be cooled to the ambient temperature of 20 ℃ to 25 ℃ after the last application.

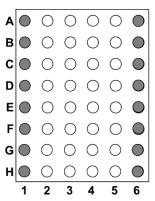During the extended self-test the Biometra TAdvanced checks several functions and components:

Test	Function
Cooler	Incubates the sample block to 4℃ and checks if the temperature in the block is reached and can be held for a longer time.
Thermal tracking	Checks the synchronism of the control circuits and if they work together in a coordinated way.
Heating and cooling rate	Checks if the specified average heating and cooling rate is reached.
Refrigeration	Checks if the heat sink and the fans are working properly to-gether.
Gradient[1]	Checks if the sample block reaches the set gradient tempera-tures.
Heated lid	Tests if the heated lid reaches the set temperature and can hold it for a longer time.
Regulation	Tests if the sample block is controlled properly.

[1] for gradient-capable models only

The Biometra TAdvanced software will automatically recommend at regular intervals to carry out an extended self-test. Although it is not absolutely necessary to perform the test, it is highly recommendable to follow the prompt and to let the device check itself.

Before starting the extended self-test, insert a microplate or, if applicable, two strips or a row of tubes in the first and last row into the sample block (see Fig. 95). It is very im-portant to load the sample block as described with plasticware because during the ex-tended self-test the operation of the heated lid is tested and this test can only be carried out with a correctly loaded sample block. The position of the plasticware in the block is also very important to ensure optimal contact pressure and uniform horizontal align-ment of the heated lid.

96 well sample block (Biometra TAdvanced Mono)   48 well sample block (Bioemtra TAdvanced Twin)

Fig. 95   Sample block loaded with plasticware for the extended self-test

When the plasticware has been properly inserted and the heated lid is closed, the ex-
tended self-test can be started. To start the extended self-test press:

Start Self Test

Fig. 96   Extended self-test screen

The software provides a progress overview during the extended self-test. When a test
has finished, the result **Passed** or **Failed** is displayed. For the currently running test, the
status **Running** is shown and all other tests for which no result is shown are not finished
yet.

Note: The extended self-test will take approx. 30 minutes. The device is blocked while
the test is running and no other program can be started. To stop the extended self-test,
press the **Cancel Self Test** button.

Cancel Self Test	

If the extended self-test is canceled, either no log file or an incomplete log file will be created.

Fig. 97   Extended self-test overview screen (Biometra TAdvanced Mono)
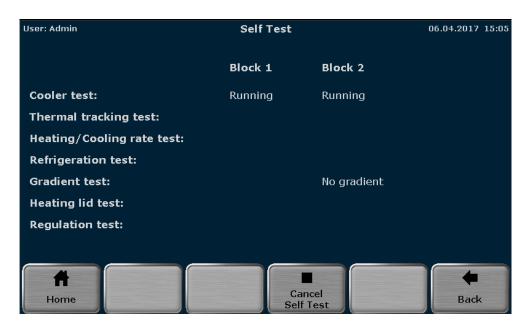

Fig. 98   Extended self-test overview screen (Biometra TAdvanced Twin)

The results of the extended self-test are summarized in a log file, stored by the device and can be viewed by the user (see section "Extended self-test log file" p. 109).

11.5   Service info file (SINF)

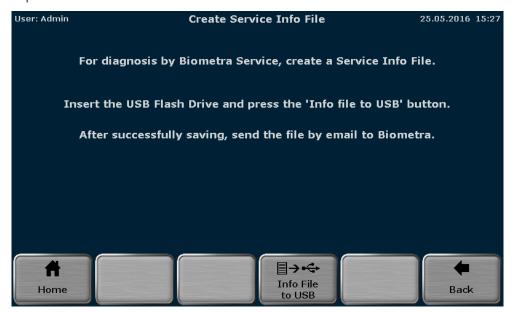The service info file is a helpful tool for remote fault diagnosis by the Biometra service department.

Fig. 99   Service info file creation screen

To create a service info file, connect a USB stick to the Biometra TAdvanced and press the **Info File to USB** button.

Info File to USB	

The service info file can be sent by e-mail to the Biometra service department. For contact details, refer to the inside front cover.

11.6   Backup

The backup function is used to synchronize the memory contents between Biometra TAdvanced thermal cyclers. With the backup all folders, programs, users and user settings can be stored to USB and transferred to another Biometra thermal cycler of the same type.

Fig. 100   Backup file screen

Connect a USB stick to the device and press the **Save backup file** button to create a backup file.

Save backup file	

To load a backup file, select it in the list and press the **Load backup file** button.

Load backup file	

Backup files that are no longer used can be deleted using the functions:

Delete all backup files	
Delete backup file	

11.7   Cycler Information

The Cycler Info screen provides general information about the device like:

- Cycler type
- Company
- Serial number cycler
- Block type
- Block serial number
- Software version

- Revision number power board
- Software version power board
- Software version power board logic
- Revision number processor board
- Software version processor board
- Revision number IO

- Protocol version   - Software version IO

The information is summarized in two screens. Press the **System/Cycler Info** button to toggle between the two screens.
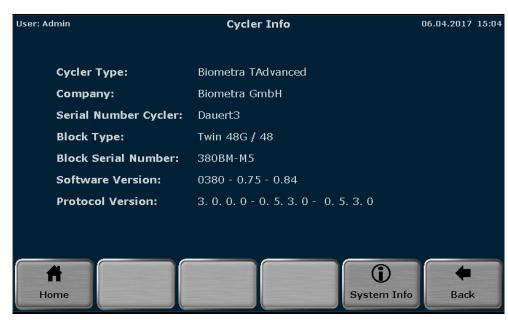
System/Cycler Info	

Fig. 101   Cycler Info screen

11.8   Contact

Shows contact details for the Biometra service department.

Fig. 102   Service department contact details screen

12   Adaptation of programs

If programs are exchanged between different thermal cycler models or the sample block is exchanged, programs might need to be adapted to the installed sample block type prior to the start or during editing. The following table provides an overview of possible program adaptations:

Cause	Example	Adaptation
The maximum gradient range is exceeded.	A program for the 96 well silver block with a programmed gradient range of >30℃ is to be started on a 96 well aluminum block and exceeds the block's maximum permitted gradient range.	The temperature range of the gradient will be reduced based on the average temperature of the maximum permitted range. If, for example, the average temperature of the programmed gradient is 60℃ and the gradient range is ± 20℃, the gradient will be reduced to 60℃ ± 15℃.
A program with a gradient step is transferred to a non-gradient-enabled device.	The program with the gradient step is started on a sample block without gradient function.	The gradient will be deleted and the average temperature or annealing temperature will be used for this step. If the average temperature or annealing temperature of the programmed gradient is, for example, 60℃, this value will be used for the step.
The gradient is outside the permitted limit.	A program for the 96 well silver block with a gradient temperature below 20℃ is to be started on a 96 well aluminum block and falls below the minimum permitted temperature.	The lower temperature is increased to the minimum permitted value. If, for example, a gradient is programmed from 5℃ to 25℃, the gradient is changed to 20℃ to 25℃.
A program with a temperature optimization step (TOS) is transferred to a device that does not offer this function.	A TOS program is transferred from the Biometra TRIO to another cycler type.	The average value of the temperatures programmed in the TOS step for the left and right sample block is used.
The heating and cooling rate is exceeded.	A program for a 96 well silver block is to be started on a 96 aluminum block.	The heating and cooling rate will be adjusted to the maximum possible value for the installed sample block type. If the programmed heating and cooling rate is, for example, 8℃/s, it will be reduced for the aluminum block to 6℃/s.
The heating and cooling rate is not reached.	A program for a 96 well aluminum block is to be started on a 96 silver block.	The heating and cooling rate will be increased to the maximum possible value for the installed sample block type. If the programmed heating and cooling rate is, for example, 6℃/s, it will be increased for the silver block to 8℃/s.
User-defined heating and cooling rate.	The heating and cooling rate is lower than the maximum value for a program step.	The user-defined value is maintained and not adjusted.

Note: If programs need to be adapted to the installed sample block, a message is always displayed prior to the start or during editing. The user can confirm or reject the adaptations. If a necessary adaptation is rejected during the attempt to start a program, the program cannot be started by the device.

13   Quick reference guide

WARNING

Before initial operation check the correct operating voltage is set on the voltage selection switch on the underside of the device. Do not open the housing of the device unless you are authorized to do so. Danger of electric shock!

CAUTION

The sample block and the heated lid can reach high temperatures during operation. Both the sample block and the heated lid can burn you. The samples are heated up quickly and may come to an explosive boil. Wear goggles when handling hot samples. Make sure that the lid is closed securely before starting the program!

NOTICE

The use of oil between samples and sample block is not necessary to achieve an improved heat exchange. If you wish to use oil, never use silicone oil. Use mineral oil.
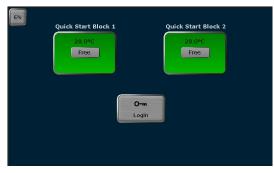
Ensure that the ventilation slits are clear. Insufficient ventilation may cause the device to overheat. Tip: Clean the air inlets on the underside of the device at regular intervals to ensure optimum airflow.

Important: Release the lid wheel before opening the lid! Adjust the lid wheel for every individual run!

Login

After the initial self-test, the login screen is displayed:

Login screen for Biometra TAdvanced Mono   for Biometra TAdvanced Twin

- Press **Login** to log in as an existing user.

- Press **Quick Start** for the non-user-specific quick start of programs.

- Press **EN/DE/CN** to change the language setting of the login screen.
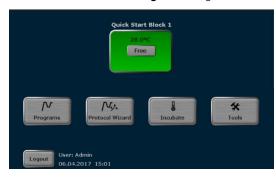
Home screen

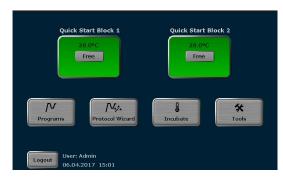After login the Biometra TAdvanced home screen opens.

- Press **Quick Start** for the user-specific quick start of programs.

- Press **Programs** to edit, save, copy or run programs.

- Press **Incubate** to incubate the sample block at a constant temperature.

- Press **Tools** to access the system settings, user management, documentation, backup tool or self-test functions.

■ Press **Logout** to log out.

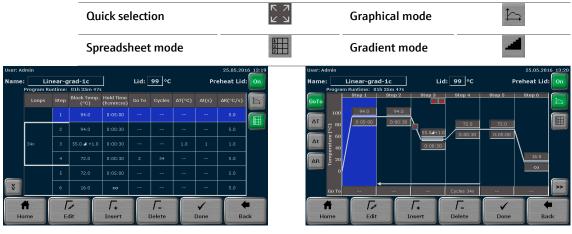Home screen for Biometra TAdvanced Mono

for Biometra TAdvanced Twin

Editing, saving and copy-
ing programs

■ Press **Programs** on the home screen to open the program overview:

■ To edit a template, press **New from template**, select a template from the list and press **Open template**.

■ To edit a stored program, select a user directory and a program and press **Edit**.

■ Alternatively, a user or a program can be selected via the quick selection.

The Biometra TAdvanced programming screen opens. Use the following buttons to toggle between the different programming modes:

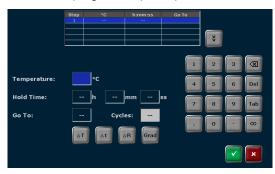| Quick selection		Graphical mode	
Spreadsheet mode		Gradient mode	

Spreadsheet programming screen

Graphical programming screen

■ Enter a program name. To do this, touch the **Name** input field and enter a name using the Biometra TAdvanced keyboard.

■ Define the status and the temperature of the heated lid. Touch the **Heated lid** input field and switch the heated lid on or off. If the heated lid is switched on, enter a temperature between 30℃ and 110℃.

- To switch the heated lid preheating on or off, press the corresponding button.

- Select a program step and press **Edit**. The screen for editing program steps opens:
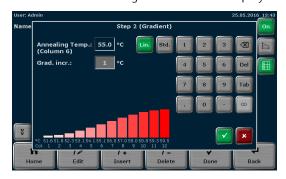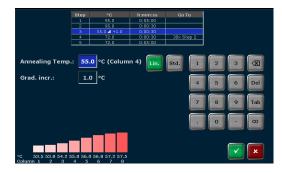

- Use the cursor keys above the keyboard to switch between program steps. The number of the currently activated step is displayed on a blue background in the table at the top of the screen.

- Touch the **Temperature** input field and enter a temperature **°C**.

- Touch the **Hold time** input field and enter a time. To program a pause step press ∞.

- To program a loop, touch the **Go To** input field and enter the step number to which the program should return. Then touch the **Cycles** input field and enter how often the loop should be repeated.

- To reduce or increase the annealing temperature from step to step within a loop, press **ΔT** and set a negative or positive temperature increment.

- To reduce or increase the hold time from step to step within a loop, press **Δt** and set a time increment.

- To adjust the heating rate, press **ΔR** and enter a value between 0.1 ℃ and max. You can accept the heating rate for all steps in the program by activating the **Apply heating/cooling rate to all steps** checkbox.

For gradient-capable devices only

- To program a gradient, press **Grad**. On the next screen you can choose between standard **Std.** and linear gradient programming **Lin.**. For standard programming enter a temperature for both the first and last row in the sample block. For linear programming enter the primer annealing temperature and set a temperature increment. The gradient curve is displayed. Press ✓ to confirm your entries.

Programming of linear gradient at TAdvanced Mono   at TAdvanced Twin

- Press ✓ on the screen to accept the settings. The software leaves the screen and opens the spreadsheet or graphical program display.

- Alternatively, individual program parameters for a step can be edited. In the spreadsheet view press directly on the cell in the program table which you want to edit. In

the graphical view press on the desired parameter edit field. Program options (loops, temperature and time increment, heating and cooling rate) must be activated using the button to the left of the graphical display.

- To insert a program step, select a step and press **Insert**. In the next screen enter the desired parameters and confirm the settings by pressing ✓.

- To delete a program step, select it and press **Delete**.

Incubation at 15 ℃ rather than 4 ℃ at the end of a run increases the device's life time.

- When all the parameters for all steps have been entered, confirm the settings on the programming screen with **Done**.

- To save the program, select a user directory and a storage location in the next screen. Then press **Save**. The program is now saved.

- To copy programs, press **Programs** on the Biometra TAdvanced home screen.

- To copy all programs located in a directory, select a directory and press **Copy all**. Select a directory to which the programs should be copied and press **Save**.

- To copy a single program, select a directory and a program and press **Copy**. Select a directory and a storage location and press **Save**.

- To delete all programs located in a directory, select it and press **Delete all**. Confirm the confirmation prompt.

- To delete a single program, select a directory and a program and press **Delete.** Confirm the confirmation prompt.

Starting, stopping and pausing programs

- The Biometra TAdvanced stores the latest 5 started or edited programs for each user. To quick start a program, press the **Quick Start** button on the Biometra TAdvanced home screen. Select a program from the list and press **Start**.

- To start a program from a user directory, press **Programs** on the Biometra TAdvanced home screen. Then select a directory and a program and press **Start**. After the start the current program is shown in a spreadsheet, graphical or gradient view. Use the same buttons as in the programming screen to switch between the different views. The active step is highlighted in yellow (see below).

- To pause an active program, press **Pause**. The color of the highlighted step changes to blue and the message **Pause** is shown in the **Step** field.

- To continue a paused program, press **Continue**. To skip a step, press **Skip**.

- To stop an active program, press **Stop program** and confirm the prompt. Programs with a pause in the last step have to be stopped manually as well.

Spreadsheet view

Graphical view

14   Fault removal

14.1   Administrator password forgotten

If the administrator has forgotten his password, use the **Factory settings** function (see section "Factory settings" p. 98) to reset the system and download a backup file for recovery (see section "Backup" p. 114).

14.2   Slow heating and cooling

The Biometra TAdvanced is equipped with strong fans that remove the heat from the heat sink. The air supply to these fans is located on the underside of the device. Make sure that the inlet is not clogged by dust or other material (e.g., a piece of paper under the device may be sucked into the fan and restrict its functionality). Dirt should be frequently removed from the air supply of the fan with a vacuum cleaner or a brush.

14.3   Auto restart

The Biometra TAdvanced features an auto restart function. If a power failure occurs during a run, the device will continue the run at the same point when the power returns. In case of long-term power failure (longer than 30 minutes) the device keeps the sample block at 4℃ (freeze step) and the user can decide whether the device should continue the run or whether the samples should be discarded.

Note: After an auto restart the user has to log in again. In addition information can be displayed for a limited time.

14.4   Auto restart without an apparent cause

High voltage fluctuations may lead to a restart of the Biometra TAdvanced. The device will then react similar to a power failure.

The following messages are displayed (see section "Auto restart" p. 123):

■ A power failure occurred during the run.

■ Time and step at which the program was restarted.

To avoid high voltage fluctuations, do not connect the Biometra to a socket shared by other, very strong power consumers (such as refrigerators or centrifuges).

Note: After an auto restart the user has to log in again. In addition information can be displayed for a limited time.
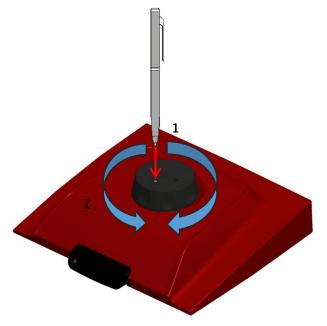
14.5   Adaptation of programs from other thermal cyclers

Since the Biometra TAdvanced thermal cycler is a very fast device, it may be necessary to reduce the heating and cooling ramp when running protocols from other (slower) thermal cyclers (see section "Adjusting the ramp rate" p. 56). Alternatively, the hold times may be extended.

14.6   Loosening the lid wheel in case of blockage

When the heated lid is in the highest or lowest position, it may happen that the lid wheel is uncoupled. In this situation the clutch mechanism is active in both directions (there is a clicking noise in both directions).

To unlock the lid wheel, press down the metal pin on the top of the lid wheel with a pen. This overrides the clutch mechanism. Take care not to apply excessive pressure.

Lid blocked in the top position:

1. Press down the metal pin.

2. Carefully turn the lid wheel **clockwise** until it moves again without resistance (no more clicking). Release the pin and turn the lid down until the clutch mechanism is activated (clicking noise, optimum contact pressure reached).

Lid blocked in the bottom position:

1. Press down the metal pin.

2. Carefully turn the lid wheel **counterclockwise** until it moves again without resistance (no more clicking). Release the pin and turn the lid wheel upward until the pressure is completely released. Open the lid.

Important: When the clutch mechanism is active (= optimal contact pressure reached) do not, under any circumstances, press the metal pin again to increase the contact pressure further. This will damage the samples and the device.

14.7   Recommendations for the use of 384 well sample blocks

■ Reduce the temperature of the heated lid

Due to the fact that the heated lid of a 384-well plate is very close to the reaction volume, the lid temperature can have a significant effect on the effective incubation temperature.

For reaction volumes below 10 µl it is recommended to set the lid temperature to 95 ℃.

If you are working with a reaction volume of 10 µl or more, set the lid temperature to 85 ℃.

Note: This applies to usual PCR conditions with up to 95 ℃ for denaturation and with a room air humidity up to 70 %.

In case you are using higher denaturation temperatures than 95 ℃ or if the local room air humidity is higher than 70 %, then you should set at least the same lid temperature you are using as highest block temperature.

For example:

- Using 96 ℃ then please set 96 ℃ lid temperature, independent from sample volume.

- Using 94 ℃ at air humidity > 70 %, please set 95 ℃ for sample volumes < 10 µl resp. set 94 ℃ for sample volumes > 10 µl.

Even with these reduced lid temperatures, condensation will not be a problem. It is recommended to reduce the lid temperature according to the reaction volume. Otherwise sample volumes or amplification yields could be reduced.

15   Maintenance and care

The Biometra TAdvanced is mainly maintenance-free.

The care and maintenance tasks which can be performed by the customer are limited to the cleaning and disinfection of the housing and sample block.

All maintenance work and repairs beyond this scope must only be performed by Biometra GmbH customer service personnel or authorized and trained persons. Any unauthorized intervention limits warranty entitlements. If the device exhibits any faults or defects, please contact the Biometra GmbH customer service department immediately.

In order to guarantee sound and safe operation and to ensure laboratory certification, we recommend concluding a maintenance agreement with regular device validation.

15.1   Cleaning the housing

WARNING

Risk of electric shock! Prior to commencing any maintenance or cleaning work, switch off the device and pull out the mains plug. After cleaning, wait until the Biometra TAdvanced is completely dry before recommissioning it.

WARNING

If you are handling infectious and pathogenic materials observe the relevant safety regulations. Decontaminate the device in accordance with section "Disinfecting the device" p. 127.

The professional decontamination of radioactive contaminations depends on the type of substance used. Please contact your radiation protection officer on this matter and observe the relevant safety regulations!

NOTICE

The use of alcohol, organic solvents or abrasives can damage the paintwork. When cleaning, please also pay attention to the notes in section "Safety instructions – maintenance and repair" p. 14.

- Only wipe the housing of the Biometra TAdvanced with a soft clean cloth which may be slightly wetted with a commercial neutral detergent, if necessary.

- Clean the ventilation slits on the underside and at the rear of the device with a vacuum cleaner.

15.2   Disinfecting the device

WARNING

Biological hazard! Clean the Biometra TAdvanced with particular care after analyzing potentially infectious material. Wear suitable protective equipment, e.g., protective gloves.

NOTICE

The only suitable cleaning method for the housing is wipe disinfection.

When using spray disinfectants there is a risk that the liquid enters the sensitive electronic system through the ventilation slits. If the disinfectant has a spray nozzle, apply disinfectant to a suitable cloth before using it on the device.

- Avoid contamination by handling sample substances with care.
- Wipe spilled samples or reagents immediately with an absorbent cloth or piece of paper.
- If the Biometra TAdvanced is used for the analysis of infectious material, great care must be taken because the TAdvanced cannot be decontaminated as a whole device.
- Immediately remove visible contamination by suitable means. Do not allow solvents to enter the device.
- The sample block is also suitable for wipe and spray disinfection. The only suitable cleaning method for the housing is wipe disinfection.

Device part	Recommended disinfectants	Provider
Sample chamber	Descosept AF	Dr. Schuhmacher GmbH
	Meliseptol HBV (cloths)	B. Braun company
Housing	Descosept Spezial	Dr. Schuhmacher GmbH

15.3   Firmware update

Please contact the Biometra customer service department or your local dealer for instructions on how to upgrade the Biometra TAdvanced firmware.

16   Transport

If you have any problems with the device, please contact the customer service depart-
ment or your local Biometra dealer. For the address of the Biometra customer service
department refer to the inside front cover of this operating manual.

Please observe the return information (see section "Device return information" p. 128) if
you wish to return a device to Biometra.

16.1   Device return information

WARNING

Risk of damage to health due to improper decontamination! Perform a professional de-
contamination before returning the device to Analytik Jena AG.

NOTICE

Biometra GmbH must refuse acceptance of contaminated devices. The sender may be
liable for any damage caused by inadequate decontamination of the device.

- Please clean all device components from biologically hazardous, chemical or radioac-
  tive contamination (see also section "Disinfecting the device" p. 127).

- Download the decontamination declaration as an editable PDF document in German
  or English from the Internet:
  https://www.analytik-jena.com/fileadmin/content/service/customer/Declara-
  tion_of_decontamination_en_01.pdf.
  Complete the form and attach the signed decontamination declaration to the outside
  of the shipment.

- Only use the original packaging for the shipment and insert the transport lock.
  If the original packaging is no longer available, please contact Biometra GmbH or
  your local dealer.

- Please attach the warning note
  "**CAUTION! SENSITIVE ELECTRONIC DEVICE!**" to the packaging.

- Please include a sheet containing the following data:

    - Name and address of the sender

    - Name and telephone number of a contact for inquiries

    - A detailed description of the fault, the precise conditions and situations under
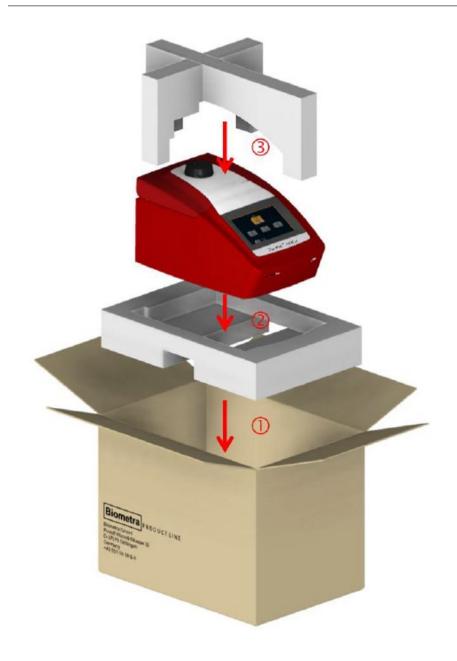   which the fault occurs

16.2   Packing the Biometra TAdvanced

Biometra uses an extra designed packaging system with inserts of foamed material.

NOTICE

The thermal cycler is only protected from transport damage if the original packaging is used and the packing instructions are followed. Biometra is not liable for transport damage due to incorrect packaging.

17   Disposal

The user of the Biometra TAdvanced must dispose of any waste materials that occur during measurements (sample materials) in accordance with statutory and local regulations.

At the end of its service life, the Biometra TAdvanced and all its electronic components must be disposed of as electronic waste in accordance with valid regulations.

18   Specifications

18.1   Model specific data

There is a range of 12 models with monoblocks or twinblocks, with specific capacities and block materials as well as with and without gradient function.

Order number		846-x-070-211	846-x-070-201
Model		Biometra TAdvanced 96	Biometra TAdvanced 96 G
Capacity		96 x 0.2 ml tubes, 96 well micro plates or 12 x 8 well strips	
Block material		Aluminum	
Block coating		Special alloy	
Block exchange (optional)		Quick-X-change	
Block exchange time		less than 10 sec	
Max. heating rate*		6.0 ℃/sec	
Max. cooling rate*		4.0 ℃/sec	
Avg. heating rate*		5.5 ℃/sec	
Avg. cooling rate*		3.5 ℃/sec	
Gradient		–	30 ℃
Gradient temperature range[1]		–	20 ℃ to 99 ℃
Temperature uniformity	95℃	+/- 0.60 ℃ after 15 s	
	72℃	+/- 0.30 ℃ after 15 s	
	55℃	+/- 0.20 ℃ after 15 s	
Temperature range		3 ℃ to 99 ℃	
Control accuracy		+/- 0.1 ℃	
Lid temperature range		30 ℃ to 110 ℃	

*   measured inside the block
[1]   only for model type "G" featuring gradient function
x = 2 for 230 V, 4 for 115 V, 5 for 100 V

Order number		846-x-070-251	846-x-070-241
Model		Biometra TAdvanced 96 S	Biometra TAdvanced 96 SG
Capacity		96 x 0.2 ml tubes, 96 well micro plates or 12 x 8 well strips	
Block material		Silver	
Block coating		Gold	
Block exchange (optional)		Quick-X-change	
Block exchange time		less than 10 sec	
Max. heating rate*		8.0 ℃/sec	
Max. cooling rate*		5.5 ℃/sec	
Avg. heating rate*		7.0 ℃/sec	
Avg. cooling rate*		4.5 ℃/sec	
Gradient		–	40 ℃
Gradient temperature range[1]		–	4 ℃ to 99 ℃
Temperature uniformity	95℃	+/- 0.50 ℃ after 15 s	
	72℃	+/- 0.25 ℃ after 15 s	
	55℃	+/- 0.15 ℃ after 15 s	
Temperature range		3 ℃ to 99 ℃	
Control accuracy		+/- 0.1 ℃	
Lid temperature range		30 ℃ to 110 ℃	

*   measured inside the block
[1]   only for model type "G" featuring gradient function
x = 2 for 230 V, 4 for 115 V, 5 for 100 V

Order number		846-x-070-210	846-x-070-200
Model		Biometra TAdvanced 60	Biometra TAdvanced 60 G
Capacity		60 x 0.5 ml tubes	
Block material		Aluminum	
Block coating		Special alloy (gold color.)	
Block exchange (optional)		Quick-X-change	
Block exchange time		less than 10 sec	
Max. heating rate*		6.0 ℃/sec	
Max. cooling rate*		4.0 ℃/sec	
Avg. heating rate*		5.5 ℃/sec	
Avg. cooling rate*		3.5 ℃/sec	
Gradient		–	30 ℃
Gradient temperature range[1]		–	20 ℃ to 99 ℃
Temperature uniformity	95℃	+/- 0.60 ℃ after 15 s	
	72℃	+/- 0.30 ℃ after 15 s	
	55℃	+/- 0.20 ℃ after 15 s	
Temperature range		3 ℃ to 99 ℃	
Control accuracy		+/- 0.1 ℃	
Lid temperature range		30 ℃ to 110 ℃	

*   measured inside the block
[1]   only for model type "G" featuring gradient function
x = 2 for 230 V, 4 for 115 V, 5 for 100 V

Order number		846-x-070-224	846-x-070-214
Model		Biometra TAdvanced 384	Biometra TAdvanced 384 G
Capacity		384 well micro plates	
Block material		Aluminum	
Block coating		Special alloy	
Block exchange (optional)		Quick-X-change	
Block exchange time		less than 10 sec	
Max. heating rate*		4.0 ℃/sec	
Max. cooling rate*		2.0 ℃/sec	
Avg. heating rate*		3.8 ℃/sec	
Avg. cooling rate*		1.7 ℃/sec	
Gradient		–	24 ℃
Gradient temperature range[1]		–	20 ℃ to 99 ℃
Temperature uniformity	95℃	+/- 0.60 ℃ after 15 s	
	72℃	+/- 0.25 ℃ after 15 s	
	55℃	+/- 0.15 ℃ after 15 s	
Temperature range		3 ℃ to 99 ℃	
Control accuracy		+/- 0.1 ℃	
Lid temperature range		30 ℃ to 110 ℃	

*   measured inside the block
[1]   only for model type "G" featuring gradient function
x = 2 for 230 V, 4 for 115 V, 5 for 100 V

Order number		846-x-070-212	846-x-070-202
Model		Biometra TAdvanced Twin 48	Biometra TAdvanced Twin 48 G
Capacity		Two blocks with 2 x 48 x 0.2 ml tubes, 2 x 48 well micro plates or 2 x 6 x 8 well strips	
Block material		Aluminum	
Block coating		Special alloy	
Block exchange (optional)		Quick-X-change	
Block exchange time		less than 10 sec	
Max. heating rate*		5.2 ℃/sec	
Max. cooling rate*		4.1 ℃/sec	
Avg. heating rate*		5.1 ℃/sec	
Avg. cooling rate*		4.0 ℃/sec	
Gradient		−	20 ℃
Gradient temperature range[1]		−	20 ℃ to 99 ℃
Temperature uniformity	95℃	+/- 0.60 ℃ after 15 s	
	72℃	+/- 0.30 ℃ after 15 s	
	55℃	+/- 0.20 ℃ after 15 s	
Temperature range		3 ℃ to 99 ℃	
Control accuracy		+/- 0.1 ℃	
Lid temperature range		30 ℃ to 110 ℃	

*   measured inside the block[1] only for model type "G" featuring gradient function
x = 2 for 230 V, 4 for 115 V, 5 for 100 V

Order number		846-x-070-213	846-x-070-215
Model		Biometra TAdvanced Twin 30	Biometra TAdvanced Twin combi
Capacity		Two blocks with 2 x 30 x 0.5 ml tubes	Two blocks with 2 x 48 x 0.2 ml tubes, 2 x 48 well micro plates 2 x 6 x 8 well strips or 2 x 35 x 0.5 ml tubes**
Block material		Aluminum	
Block coating		Special alloy	
Block exchange (optional)		Quick-X-change	
Block exchange time		less than 10 sec	
Max. heating rate*		4.2 °C/sec	3.1 °C/sec
Max. cooling rate*		3.3 °C/sec	2.3 °C/sec
Avg. heating rate*		4.1 °C/sec	3.0 °C/sec
Avg. cooling rate*		3.1 °C/sec	2.2 °C/sec
Gradient		–	–
Gradient temperature range[1]		–	–
Temperature uniformity	95°C	+/- 0.60 °C after 15 s	+/- 0.50 °C after 15 s
	72°C	+/- 0.30 °C after 15 s	+/- 0.25 °C after 15 s
	55°C	+/- 0.20°C after 15 s	+/- 0.20 °C after 15 s
Temperature range		3 °C to 99 °C	
Control accuracy		+/- 0.1 °C	
Lid temperature range		30 °C to 110 °C	

*   measured inside the block
** special tubes with small caps
[1]   only for model type "G" featuring gradient function
x = 2 for 230 V, 4 for 115 V, 5 for 100 V

18.2   Specifications for all models

The following specifications apply to all models:

Software	User-specific quick start option for the five most recent programs; program preview before start; option for toggling between spreadsheet and graphical programming mode; Linear Gradient Tool[1], service info file (SINF) generation; expanded self-test; adjustable ramp rates; Ethernet-based PC control; comprehensive user administration tool; Protocol Wizard
Program memory	Total capacity of 350 programs à 6 steps in up to 90 user directories
Language	English, German, Chinese
Display	7" color touchscreen
Automatic restart after power failure	Yes
High Performance Smart Lid (HPSL) technology	Yes
Power consumption	850 watt
Operating voltage	100, 115, 230 Volt, 50-60 Hz
Noise emissions	Very low, max. 45 dB
Interfaces[2]	USB A, Ethernet
Environmental conditions	15 °C to 35 °C, 70 % air humidity, max. 2,000 m above sea level
Dimensions (WxDxH)	277 mm x 457 mm x 264 mm
Dimensions (WxDxH) with open lid	277 mm x 457 mm x 414 mm
Weight	15 kg

[2]   The network cable must be at least performance class Cat 5e and the cable configuration has to be STP

19   Declaration of conformity

analytikjena

An Endress+Hauser Company

EU – Konformitätserklärung
EC - Declaration of Conformity

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Göttingen, den 22.11.2018

Biometra erklärt als Hersteller in alleiniger Verantwortung, dass die Produkte
Biometra declares as manufacturer under sole responsibility that the products

Typen *Types:*	**Biometra TAdvanced 60** **Biometra TAdvanced 60 G**	**Biometra TAdvanced 96** **Biometra TAdvanced 96 S**	**Biometra TAdvanced Twin 48,** **Biometra TAdvanced Twin 48 G**
		Biometra TAdvanced 96 G	**Biometra TAdvanced Twin 30**
	Biometra TAdvanced Basiseinheit/Base Unit	**Biometra TAdvanced 96 SG** **Biometra TAdvanced 384**	**Biometra TAdvanced Twin combi**
		Biometra TAdvanced 384 G	
Best.-Nr. **Order No.:**	846-x-070-210 846-x-070-200	846-x-070-211 846-x-070-251	846-x-070-212 846-x-070-202
		846-x-070-201	846-x-070-213
	846-x-070-280	846-x-070-241	846-x-070-215
		846-x-070-224	
		846-x-070-214	

x = 2 für/*for* 230 V, 4 für/*for* 115 V, 5 für/*for* 100 V

den folgenden Europäischen Richtlinien und angewandten harmonisierten Normen entsprechen:
conform to the following European Directives and applied harmonized standards:

Richtlinie *Directive*	**Norm** *Standard*	**Ausgabejahr** *Year of Publication*
2014/35/EU **Niederspannungsrichtlinie/LVD**	EN 61010-1 EN 61010-2-10	2010 2014
2014/30/EU **EMV/EMC**	EN 61326-1 EN 55011 EN 61000-3-2 EN 61000-3-3	2013 2009 2014 2013
2011/65/EU **RoHS**	EN 50581	2012

Dr. Juergen Otte
Head of Quality Management

For and behalf of Biometra GmbH

20 Index

Příloha č. 2 – Seznam spotřebního materiálu
(spotřební materiál potřebný k provedení servisu v rámci pravidelných preventivních prohlídek stanovených výrobcem zařízení nebo příslušnými právními předpisy-náklady na tento spotřební materiál jsou zahrnuty v ceně BTK, periodických prohlídek a prav. servisního zásahu)

K provedení servisu není zapotřebí žádný spotřební materiál.