



Product guide book

Boditech Med Inc.



Advanced Compact Immunofluorescence Analyzer

ichroma™ II

- ▶ High performance with reliability
- ▶ Small, compact & light
- ▶ Multi-test function
- ▶ LIS/HIS compatible



Specifications

QC/Calibration

- System check cartridge
- Internal & external controls

Interface

- 7" touch screen
- Built-in thermal printer
- USB port / USB OTG port / Ethernet
- SD card slot / WiFi
- LIS / HIS compatible

Memory

- 1,000 patient results
- 1,000 QC results
- 100 User IDs

Analyzer

- 276 x 220 x 91 mm
- 1.3 kg
- 100 – 240 V AC, 50-60 Hz
- Battery (AA×4)

High-throughput Immunofluorescence Analyzer

ichroma™ III

- ▶ Random access for various parameters
- ▶ Continuous testing
- ▶ Flexible temperature control
- ▶ Patient ID handwriting for user convenience
- ▶ ID chip memory function



Specifications

QC/Calibration

- System check cartridge
- Internal & external controls

Interface

- 7" touch screen
- Built-in thermal printer
- USB port / Ethernet
- SD card slot / RS232C port
- LIS/HIS compatible

Memory

- 5,000 patients results
- 500 ID chips
- 100 User IDs

Analyzer

- 240 x 465 x 341 mm
- 11 kg
- 100-240 V AC, 50-60 Hz
- Internal temperature control

World First Automated Dry Immunoassay System

ichroma™-50 PLUS

- ▶ Full automation from sample to result
- ▶ High throughput
 - Capable of processing up to 20 individuals per hour for IGRA-TB test
- ▶ Ready for universal blood collection tube
- ▶ Various types of sample
 - Whole blood, fingertip blood, serum, plasma and stool



Specifications

QC/Calibration

- Internal & external controls

Interface

- 10.1-inch TFT LCD (touch screen)
- Built-in thermal printer
- USB port / Ethernet
- SD card slot / RS232 port
- LIS/HIS compatible

Memory

- 10,000 test results

Analyzer

- 622.5 x 612.6 x 470 mm
- 55 kg
- 100-240 V AC, 50/60 Hz

Mini size Fluorescence Immuno-analyzer

ichroma™ M2 & M3

- ▶ Portable and compact with high performance
- ▶ One-click operation for user convenience
- ▶ Power supply with portable charger



Specifications

QC/Calibration

- System check cartridge
- Internal & external controls

Interface

- One-button operation
- LCD display

Analyzer

- 165 x 95 x 55 mm
- 300 g
- 100-240 V AC, 50-60 Hz

ichroma™ Parameters

Category	Item	ichroma™ II	ichroma™ III	ichroma™ M2	ichroma™ M3	Sample type	Capillary Tube	Working range	Test time (min)
Cardiac	LDL Cholesterol Direct	●	●		●	S/P		10-300 mg/dL	10
	hsCRP	●	●		●	WB/S/P		0.1-10 mg/L	3
	D-Dimer	●	●		●	WB/P		50-10,000 ng/mL	12
	D-Dimer Neo	●	●		●	WB/P		50-10,000 ng/mL	12
	Tn-I	●	●		●	S/P		0.1-50 ng/mL	12
	Tn-I Neo	●	●		●	S/P		0.1-50 ng/mL	12
	Tn-I Plus	●	●	●		WB/S/P	●	0.01-15 ng/mL	12
	CK-MB	●	●		●	WB/S/P		3-100 ng/mL	12
	CK-MB Neo	●	●		●	WB/S/P		3-100 ng/mL	12
	Myoglobin	●	●		●	WB/S/P		5-500 ng/mL	12
	Myoglobin Neo	●	●		●	WB/S/P		5-500 ng/mL	12
	Cardiac Triple	●	●			WB/S/P		Tn-I: 0.01-15 ng/mL CK-MB: 3-100 ng/mL Myoglobin: 5-500 ng/mL	12
	Troponin T	●	●	●		WB/S/P	●	10-20,000 pg/mL	12
	BNP	●	●	●		WB/P	●	5-5,000 pg/mL	12
	NT-proBNP	●	●	●		WB/S/P		10-30,000 pg/mL	12
	ST2	●	●		●	WB/S/P		3.1-200 ng/mL	12
Cancer	PSA	●				WB/S/P	●	S/P: 0.1-100 ng/mL (WB: 0.5-100 ng/mL)	15
	PSA Neo	●	●		●	WB/S/P	●	0.1-100 ng/mL	15
	Free PSA	●	●	●		WB/S/P	●	0.05-50 ng/mL	12
	AFP	●	●		●	WB/S/P		5-350 ng/mL	15
	AFP Neo	●	●		●	WB/S/P		5-350 ng/mL	15
	CEA	●	●		●	WB/S/P		1-500 ng/mL	15
	CEA Neo	●	●		●	WB/S/P		1-500 ng/mL	15
	iFOB Neo	●	●		●	Feces		25-1,000 ng/mL	10
	Cyfra21-1	●	●	●		S/P		1-500 ng/mL	12
	CA19-9	●	●	●		S/P		8-1,000 U/mL	12
	CA125	●	●	●		S/P		5-700 U/mL	12
Diabetes	HbA1c	●	●		●	WB	●	(NGSP) 4-15 %	12
	HbA1c Neo	●	●		●	WB	●	(NGSP) 4-15 %	12
	Microalbumin	●	●		●	Urine		2-300 mg/L	12
	Cystatin C	●	●		●	S/P		0.1-7.5 mg/L	10
	Insulin	●	●	●		WB/S/P	●	2-300 µIU/mL	12
Hormone	TSH	●	●		●	WB/S/P		0.09-100 µIU/mL	12
	TSH Plus	●	●	●		WB/S/P		0.1-50 µIU/mL	12
	T3	●	●		●	S/P		0.5-5 ng/mL (0.77-7.7 nmol/L)	8
	T4	●	●		●	S/P		10.23-300 nmol/L	8
	Free T4	●	●		●	WB/S/P		1-100 pmol/L	12
	FSH	●	●		●	S/P		1-100 mIU/mL	15
	Progesterone	●	●		●	S/P		4.45-127.2 nmol/L	15
	β-HCG	●	●		●	WB/S/P		5-50,000 mIU/mL	15
	β-HCG Plus	●	●	●		WB/S/P		2-5,000 mIU/mL	12
	LH	●	●		●	S/P		1.0-100 mIU/mL	15
	PRL	●	●		●	S/P		1-100 ng/mL	10
	Testosterone	●	●		●	S/P		0.5-12 ng/mL	12
	Cortisol	●	●		●	WB/S/P		50-800 nmol/L	10
	AMH	●	●	●		S/P		0.02-15 ng/mL	12
	PTH	●	●	●		WB/S/P		30-3,000 pg/mL	12

* No CE mark

WB = Whole blood, S = Serum, P = Plasma, NS = Nasopharyngeal swab

ichroma™ Parameters

Category	Item	ichroma™ II	ichroma™ III	ichroma™ M2	ichroma™ M3	Sample type	Capillary Tube	Working range	Test time (min)
Infection	CRP	●	●		●	WB/S/P		2.5-300 mg/L	3
	hsCRP All in one	●	●		●	WB/S/P		0.5-200 mg/L	3
	MxA/CRP	●	●		●	WB	●	MxA: 10-300 ng/mL CRP: 1-200 mg/L	12
	PCT	●	●		●	WB/S/P		0.1-100 ng/mL	12
	PCT Plus	●	●	●		WB/S/P	●	0.02-50 ng/mL	12
	PCT Plus G	●	●	●		WB/S/P	●	0.02-50 ng/mL	12
	IL-6	●	●	●		WB/S/P	●	2-2,500 pg/mL	12
	Influenza A+B	●	●	●		NS/ Nasal aspirate		Qualitative	10
	RSV	●	●	●		NS/ Nasal aspirate		Qualitative	10
	Influenza A+B/RSV	●	●	●		NS/ Nasal aspirate		Qualitative	10
	COVID-19 Ab	●	●	●		WB/S/P		Qualitative	10
	COVID-19 Ag	●	●	●		NS		Qualitative	12
	COVID-19/Flu Ag Combo	●	●	●		NS		Qualitative	20
	COVID-19/Flu A+B/ RSV Ag Combo	●	●	●		NS		Qualitative	20
	Adeno	●	●	●		NS/ Nasal aspirate		Qualitative	10
	Mycoplasma	●	●	●		Throat swab		Qualitative	10
	Strep A	●	●	●		Throat swab		Qualitative	5
	ASO	●	●		●	S/P		25-800 IU/mL	12
	HBsAg*	●				WB/S/P		Qualitative	12
	Anti-HBs*	●	●	●		WB/S/P		Qualitative	15
	Anti-HCV*	●				WB/S/P		Qualitative	12
	Dengue NS1Ag	●	●	●		WB/S/P		Qualitative	12
	Dengue IgG/IgM	●	●	●		WB/S/P		Qualitative	12
	Zika IgG/IgM	●	●	●		WB/S/P		Qualitative	12
	CHIKV IgG/IgM	●	●	●		WB/S/P		Qualitative	10
	Toxo IgM*	●	●	●		WB/S/P	●	Qualitative	12
	Toxo IgG*	●	●		●	WB/S/P	●	Qualitative	12
	Toxo IgG/IgM*	●	●			WB/S/P	●	Qualitative	12
	Rubella IgM*	●	●	●		WB/S/P	●	Qualitative	12
	Rubella IgG*	●	●	●		WB/S/P	●	Qualitative	12
	CMV IgM*	●	●	●		WB/S/P	●	Qualitative	12
	CMV IgG*	●	●	●		WB/S/P	●	Qualitative	12
	IGRA-TB** (★)					P		Qualitative	15
	IGRA-TB 25**	●	●	●		P		Qualitative	15
Autoimmune	RF IgM	●	●		●	WB/S/P	●	8-200 IU/mL	5
	Anti-CCP Plus	●	●	●		WB/S/P	●	3.5-300 U/mL (Semi-quantitative)	12
	Total IgE	●	●		●	WB/S/P		1-1,000 IU/mL	12
Other test items	Ferritin	●	●		●	S/P		10-1,000 ng/mL	10
	Vitamin D Neo	●	●		●	WB/S/P	●	5-100 ng/mL	12
	Calprotectin	●	●		●	Feces		10-1,000 mg/kg	10
	H. pylori SA	●	●		●	Feces		Qualitative	12
	KL-6	●	●		●	S/P		51-3,000 U/mL	10

* No CE mark

** IGRA-TB Tube required

(★) Available on ichroma™-50 PLUS device

WB = Whole blood, S = Serum, P = Plasma, NS = Nasopharyngeal swab

Versatile Desktop Fluorescence Immuno-analyzer

AFIAS-6

- ▶ Fast Sample-to-Answer system
- ▶ Easy to use without pipetting with proprietary C-tip
- ▶ Up to 6 different parallel tests
- ▶ Reliable test results



Specifications

QC/Calibration

- 2 calibrators & 2 controls
- Internal & external controls

Interface

- 7" touch screen
- Built-in thermal printer
- USB port / Ethernet
- SD card slot / RS232
- LIS/HIS compatible

Memory

- 5,000 patient results
- 5,000 QC results
- 500 ID chips
- 100 User IDs

Analyzer

- 420 x 336 x 293 mm
- 15.1 kg
- 100 – 240 V AC, 50-60 Hz
- Internal temperature control

Compact All-in-one Fluorescence Immuno-analyzer

AFIAS-1

- ▶ Simple procedure with All-in-One cartridges
- ▶ Easy to use without pipetting with proprietary C-tip
- ▶ Quick test results with reliability
- ▶ Small, compact, & light



Specifications

QC/Calibration

- 2 calibrators & 2 controls
- Internal & external controls

Interface

- 5" touch screen
- Built-in thermal printer
- USB port / USB OTG port / Ethernet
- SD card slot
- LIS/HIS compatible

Memory

- 5,000 patient results
- 5,000 QC results
- 500 ID chips
- 100 User IDs

Analyzer

- 180.6 x 320.6 x 206.4 mm
- 4.0 kg
- 100 – 240 V AC, 50-60 Hz
- Internal temperature control

High-throughput Fluorescence Immunoassay with blood tube

AFIAS-10

- ▶ Sample-to-Answer from blood tube
- ▶ 10 different tests in parallel
- ▶ Emergency test first during operation
- ▶ Bidirectional LIS/HIS



Specifications

QC/Calibration

- Internal & external controls

Interface

- 10.1" touch screen
- Built-in thermal printer
- USB port / Ethernet
- SD card slot / RS232
- LIS/HIS compatible

Memory

- 10,000 patients & QC results
- 100 ID chips
- 100 User IDs

Analyzer

- 426 x 443 x 395 mm
- 20 kg
- 100-240 V AC, 50-60 Hz
- Internal temperature control

Multi testing Fluorescence Immuno-analyzer

AFIAS-3

- ▶ AFIAS system for 3 parallel tests
- ▶ Extra tip station – faster TAT
- ▶ Compact system for multiple testing
- ▶ User friendly UI



Specifications

QC/Calibration

- Internal & external controls

Interface

- 7" touch screen
- Built-in thermal printer
- USB port / Ethernet
- SD card slot / RS232
- LIS/HIS compatible

Memory

- 5,000 patients results
- 5,000 QC results
- 500 ID chips
- 100 User IDs

Analyzer

- 276 x 365 x 313 mm
- 9.3 kg
- 100-240 V AC, 50-60 Hz
- Internal temperature control

AFIAS Parameters

Category	Item	AFIAS-1	AFIAS-6	AFIAS-3 AFIAS-10	Sample type	C-tip	Working range	Test time (min)
Cardiac	hsCRP	●	●	●	WB/S/P	●	0.1-10 mg/L	3
	D-Dimer	●	●	●	WB/P	●	50-10,000 ng/mL	12
	D-Dimer Neo	●	●	●	WB/P		50-10,000 ng/mL	12
	Tn-I Plus	●	●	●	WB/S/P		0.01-15 ng/mL	12
	CK-MB	●	●	●	WB/S/P		3-100 ng/mL	12
	CK-MB Neo	●	●	●	WB/S/P		3-100 ng/mL	12
	Myoglobin	●	●	●	WB/S/P		2-500 ng/mL	12
	Myoglobin Neo	●	●	●	WB/S/P		2-500 ng/mL	12
	Cardiac Triple	●	●	●	WB/S/P		Tn-I: 0.01-15 ng/mL CK-MB: 3-100 ng/mL Myoglobin: 5-500 ng/mL	12
	Troponin T	●	●	●	WB/S/P	●	10-20,000 pg/mL	12
	BNP	●	●	●	WB/P	●	5-5,000 pg/mL	12
	NT-proBNP	●	●	●	WB/S/P		10-30,000 pg/mL	12
	ST2	●	●	●	WB/S/P		3.1-200 ng/mL	12
Cancer	PSA	●	●		WB/S/P		0.5-100 ng/mL	15
	PSA Neo	●	●	●	WB/S/P	●	0.1-100 ng/mL	15
	Free PSA	●	●	●	WB/S/P	●	0.05-50 ng/mL	12
	AFP	●	●	●	WB/S/P		5-350 ng/mL	15
	CEA	●	●	●	WB/S/P		1-500 ng/mL	15
	Cyfra21-1	●	●	●	S/P		1-500 ng/mL	12
	CA19-9	●	●	●	S/P		8-1,000 U/mL	12
	CA125	●	●	●	S/P		5-700 U/mL	12
Diabetes	HbA1c	●	●	●	WB	●	(NGSP) 4-15%	10
	HbA1c Neo	●	●	●	WB	●	(NGSP) 4-15%	10
	Microalbumin	●	●	●	Urine		2-300 mg/L	12
	Insulin	●	●	●	WB/S/P	●	2-300 µIU/mL	12
Hormone	TSH	●	●	●	WB/S/P	●	0.09-100 µIU/mL	12
	TSH Plus	●	●	●	WB/S/P	●	0.08-50 µIU/mL	12
	T3	●	●	●	S/P		0.77-7.7 nmol/L	10
	T4	●	●	●	S/P		10.23-300 nmol/L	10
	Free T4	●	●	●	WB/S/P	●	1-100 pmol/L	12
	FSH	●	●	●	WB/S/P		1-100 mIU/mL	12
	Total βhCG	●	●	●	WB/S/P		5-50,000 mIU/mL	15
	β-HCG Plus	●	●	●	WB/S/P	●	2-1,500 mIU/mL	12
	LH	●	●	●	WB/S/P		1-100 mIU/mL	12
	PRL	●	●	●	WB/S/P		1-100 ng/mL	10
	Progesterone	●	●	●	S/P		4.45-127.2 nmol/L	15
	Testosterone	●	●	●	S/P		0.5-12 ng/mL	15
	Cortisol	●	●	●	WB/S/P		80-800 nmol/L	10
	AMH	●	●	●	S/P		0.02-15 ng/mL	12
	PTH	●	●	●	WB/S/P		30-3,000 pg/mL	17

* No CE mark

WB = Whole blood, S = Serum, P = Plasma, NS = Nasopharyngeal swab

AFIAS Parameters

Category	Item	AFIAS-1	AFIAS-6	AFIAS-3 AFIAS-10	Sample type	C-tip	Working range	Test time (min)
Infection	CRP	●	●	●	WB/S/P	●	0.5-200 mg/L	3
	MxA/CRP	●	●	●	WB	●	MxA: 10-300 ng/mL CRP: 1-200 mg/L	12
	PCT	●	●	●	WB/S/P		0.1-100 ng/mL	12
	PCT X	●	●	●	WB/S/P		0.1-100 ng/mL	12
	PCT Plus	●	●	●	WB/S/P	●	0.02-50 ng/mL	12
	PCT Plus G	●	●	●	WB/S/P	●	0.02-50 ng/mL	12
	IL-6	●	●	●	WB/S/P	●	2-2,500 pg/mL	12
	Flu A+B	●	●	●	NS		Qualitative	10
	RSV	●	●	●	NS		Qualitative	10
	COVID-19 Ab	●	●	●	WB/S/P	●	Qualitative	10
	COVID-19 Ag	●	●	●	NS		Qualitative	12
	COVID-19/Flu Ag Combo	●	●	●	NS		Qualitative	20
	COVID-19/Flu A+B/ RSV Ag Combo	●	●	●	NS		Qualitative	20
	Strep A	●	●	●	Throat swab		Qualitative	10
	HBsAg*	●	●	●	WB/S/P		Qualitative	12
	Anti-HBs*	●	●	●	WB/S/P		Qualitative	15
	Anti-HCV*	●	●	●	WB/S/P		Qualitative	12
	Dengue NS1 Ag	●	●	●	WB/S/P	●	Qualitative	12
	Dengue IgG/IgM	●	●	●	WB/S/P	●	Qualitative	12
	NORO	●	●	●	Feces		Qualitative	12
	ROTA	●	●	●	Feces		Qualitative	12
	Rota/Adeno	●	●	●	Feces		Qualitative	12
Autoimmune	IGRA-TB**		●	●	P		Qualitative	15
	HIV 1/2 Ab*	●	●	●	WB/S/P	●	Qualitative	10
	Anti-CCP Plus	●	●	●	WB/S/P	●	3.2-300 U/mL	12
TDM (Therapeutic Drug Monitoring)	Total IgE	●	●	●	WB/S/P		1-1,000 IU/mL	12
	Infliximab	●	●	●	WB/S/P	●	0.2-50 µg/mL	10
	Adalimumab	●	●	●	WB/S/P	●	0.2-50 µg/mL	10
	Golimumab	●	●	●	WB/S/P	●	0.2-30 µg/mL	10
	Vedolizumab	●	●	●	WB/S/P	●	2-60 µg/mL	10
	Ustekinumab	●	●	●	WB/S/P	●	0.5-20 µg/mL	10
	Etanercept	●	●	●	WB/S/P	●	0.2-10 µg/mL	10
	Trastuzumab	●	●	●	WB/S/P	●	3-150 µg/mL	10
	Total Anti-Infliximab	●	●	●	S/P		8-250 AU/mL	22
	Free Anti-Infliximab	●	●	●	WB/S	●	4-250 AU/mL	12
	Free Anti-Adalimumab	●	●	●	WB/S	●	3-200 AU/mL	12
	Free Anti-Golimumab	●	●	●	WB/S	●	2-40 ng/mL	10
	Free Anti-Vedolizumab	●	●	●	WB/S	●	10-250 ng/mL	10
	Free Anti-Ustekinumab	●	●	●	WB/S	●	2.5-100 ng/mL	12
	Free Anti-Etanercept	●	●	●	WB/S	●	10-100 ng/mL	10
Other test items	Free Anti-Trastuzumab	●	●	●	WB/S	●	8-500 AU/mL	10
	Ferritin	●	●	●	S/P		10-1,000 ng/mL	10
	Vitamin D Neo	●	●	●	WB/S/P	●	5-100 ng/mL	12
	KL-6	●	●	●	S/P		51-3,000 U/mL	10
	H. pylori SA	●	●	●	Feces		Qualitative	12
	Calprotectin	●	●	●	Feces		10-1,000 mg/kg	10

* No CE mark

**IGRA-TB Tube required

WB = Whole blood, S = Serum, P = Plasma, NS = Nasopharyngeal swab

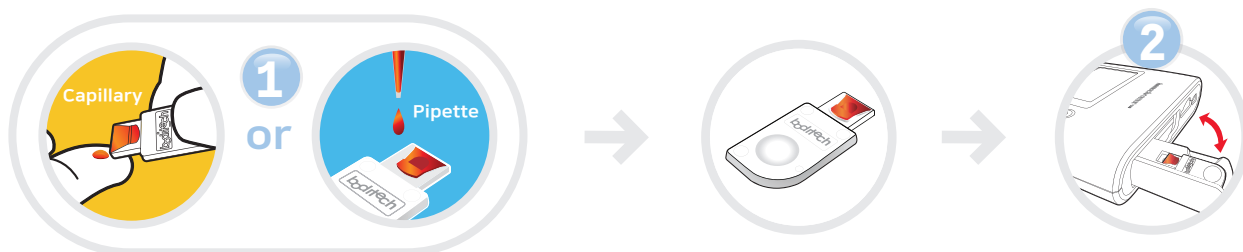
Total Hemoglobin Meter

hemochroma PLUS

- ▶ Microcuvette with dual sample inlets
- ▶ Capillary blood or tube blood

Specifications

Principle	Absorptiometry
Sample Types	Whole blood
Sample volume	15 µL
Detection range	0-27.0 g/dL
Reading time	3 seconds
Memory	1,000 tests
Analyzer	106.5 x 151.0 x 38.5 mm
Power	Batteries (AA×4) or USB charger Serial printer connection



Boditech Quick™

Rapid Diagnostic Test

- ▶ On-site diagnostics with naked eyes
- ▶ Simple test procedure
- ▶ Fast and reliable result



Category	Item	Testing type	Sample type	Test time (min)
Infection	Boditech Quick™ HIV 1/2 Ab*	IVD use	WB/S/P	15
	Boditech Quick™ Syphilis	IVD use	WB/S/P	15
	Boditech Quick™ HbsAg*	IVD use	WB/S/P	15
	Boditech Quick™ Anti-HCV*	IVD use	WB/S/P	20
	Boditech Quick™ Dengue NS1	IVD use	WB/S/P	15
	Boditech Quick™ Dengue IgM/IgG	IVD use	WB/S/P	15
	Boditech Quick™ COVID-19 Ag Nasal	IVD use	Nasopharyngeal swab Nasal swab	15
	Boditech Quick™ COVID-19 Ag Saliva	IVD use Self testing*	Saliva	15

* No CE mark

Automated Nucleic acid Extraction System

NuActor

- ▶ Fast & automatic extraction
- ▶ Exclusive cartridge system
- ▶ Magnetic bead method
- ▶ UV Sterilization



Multi-channel Nucleic acid Amplification analyzer

ExAmplar II

- ▶ Patented fast thermal cycling
- ▶ 4-channel optical channel
- ▶ ExAmplex(dedicated) and Open PCR reagents
- ▶ Nucleic acid Amplification analyzer



True Point-of-Care Molecular Diagnostics

IsoAmplar

- ▶ Isothermal amplification in one step
- ▶ Extraction free
- ▶ Up to 16 multiplex targets
- ▶ Real POC MDx



Product Name	Test unit (Box)	Dedicated device
NuActor Viral RNA extraction kit	96	NuActor
NuActor Viral DNA extraction kit	96	NuActor
NuActor Sputum DNA extraction kit	96	NuActor
ExAmplex COVID-19 PCR 3-gene Lyo kit	96	Open PCR
ExAmplex Influenza A/B SARS-CoV-2 PCR kit	96	Open PCR
ExAmplex HBV viral load Lyo kit*	96	Open PCR
ExAmplex HCV viral load Lyo kit*	96	Open PCR
ExAmplex HIV-1 viral load Lyo kit*	96	Open PCR

Product Name	Test unit (Box)	Dedicated device
ExAmplex HPV High-Risk kit**	96	Open PCR
ExAmplex HPV kit**	96	Open PCR
ExAmplex MTB/NTM kit	96	Open PCR
ExAmplex MDR-TB kit	48	Open PCR
ExAmplex SARS-CoV-2/Flu/RSV kit**	48	Open PCR
IsoAmplar COVID-19 kit	10	IsoAmplar
IsoAmplar SARS-CoV-2/Flu/RSV kit	10	IsoAmplar
IsoAmplar MTB kit**	10	IsoAmplar

*: No CE Mark
**: Coming soon



Your life, Our inspiration

Boditech Med Inc.



Boditech Med Inc.

43, Geodudanji 1-gil, Dongnae-myeon,
Chuncheon-si, Gang-won-do 24398, Republic of Korea
Tel: +82-33-243-1400, Fax: +82-33-243-9373
sales@boditech.co.kr/www.boditech.co.kr

Distributed by