Mitutoyo

Test Equipment and Seismometers

Rockwell Hardness Testing Machines
HR-200/300/400 Series

Rockwell hardness testing machine series

HR-210MR

Rockwell hardness testing machine

- Test force selection by manual weight exchange.
- Preliminary test force application guided by automatic pre-setting dial gauge
- Motor controlled additional test force application

HR-320MS

Dual type (Rockwell/Rockwell superficial) **hardness testing machine**

- Test force selection by manual weight exchange.
- Preliminary test force selected via dial and guided application by graphic indicator.
- Motor controlled additional test force application

Rockwell

Model:	HR-210MR	HR-320MS	HR-430MR	HR-430MS
Code Number	810-191-11	810-192-21	810-193-21	810-194-21
Applicable Rockwell Scales				
JIS B 7726, ISO 6508-2	•			
JIS B 7726; ISO6508-2; ASTM E18		•	•	•
HRA; HRD; HRC	•	•	•	•
HRFW; HRBW; HRGW	•	•	•	•
HRHW; HREW; HRKW	•	•	•	•
HRLW; HRMW; HRPW	•	•	•	•
HRRW; HRSW; HRVW	•	•	•	•
HR15N; HR30N; HR45N		•		•
HR15TW, HR30TW; HR45TW		•		•
HR15WW, HR30WW; HR45WW		•		•
HR15XW, HR30XW; HR45XW		•		•
HR15YW, HR30YW; HR45YW		•		•

4 Models to suit practically every application

HR-430MR

Rockwell hardness testing machine

- Test force selection by switching dial.
- Magnet brake secured preliminary test force application.
- AutoStart of additional test force application after preliminary test force is reached

HR-430MS

Dual type (Rockwell/Rockwell superficial) **hardness testing machine**

- Preliminary test force and total test force selection by switching dial.
- Magnet brake secured preliminary test force application.
- AutoStart of additional test force application after preliminary test force is reached

Brinell

Model:	HR-210MR	HR-320MS	HR-430MR	HR-430MS
Code Number	810-191-11	810-192-21	810-193-21	810-194-21
Applicable Brinell* Scales, Indentation Only				
HBW 1/30		•		•
HBW 2.5/31.25		•		•
HBW 2.5/62.5	•	•	•	•
HBW 5/62.5	•	•	•	•
HBW 10/100	•	•	•	•
HBW 5/125	•	•	•	•
HBW 2.5/187.5	•	•	•	•

*Brinell test method is non-standard because of the preliminary test force application

Optional accessories required: Brinell weight set, Brinell indenter, and a measurement microscope.

The HR-200-300-400 product line supports Brinell testing. For most supported scales, additional weight sets are required. Only indentations are generated. An additional microscope is required for the indentation measurement. Due to the Rockwell-like application of the preliminary test force, the Brinell test is not specified according to standard.

Features

Simple to operate

The automatic presetting dial gauge of the analog type HR-210MR allows easy application of the preliminary test force. When both dial-hands reach the set area, start the test with a push of the button and therefore reduce the user influence compared to fully manual systems.

Robust in any environment

The minimum level of electronics used in the HR-210MR allow for its use even in the roughest of environments. Be it close to the heat treatment line or exposure to temperature changes, the HR-210MR feels right at home.

Precise and cost-efficient

Precise and reliable test results are achieved at a great price performance ratio

Full data processing options

The digital types **HR-320MS, HR-430MR,** and **HR-430MS** take full advantage of all the Mitutoyo digimatic output options, such as data transfer by USB cable or the optional **U-WAVE** wireless data communication system.

Create reports in Excel or directly feed the data into the Mitutoyo quality management software **MeasurLink** with optional QDAS connectivity. Or simply print out results with the Digimatic Mini-Processor DP-1VA.

Secure test application reduces user influence

The advanced digital types HR-430MR and HR-430MS, with magnet brake secured preliminary test force application reduce the user influence even more. After the application of the preliminary test force, the additional test force is applied without any further action required.

At home on the shop floor and incoming goods control

Daily measurement tasks require an enduring performance of the material testing equipment. The HR-200-300-400 Series does so at any time. A huge number of accessories for application and quality management ensures secure measurements in the production site as well as at the incoming goods control department.

Specifications

Model:	HR-210MR	HR-320MS	HR-430MR	HR-430MS
Code Number	**810-191-11**	**810-192-21**	**810-193-21**	**810-194-21**
Functions				
Rockwell, Rockwell Superficial	JIS B 7726, ISO 6508-2	JIS B 7726; ISO6508-2; ASTM E18		
HR unit resolution:	0,5 HR*	0,1 HR	0,1 HR	0,1 HR
Preliminary test force:	98,07 (10kg)	29,42; 98,07 (3kg; 10kg)	98,07 (10kg)	29,42; 98,07 (3kg; 10kg)
Preliminary test force selection:	-	Dial switching	-	Dial switching
Test force Rockwell Superficial (147,1N; 294,2;N 441,3N (15kg; 30kg; 45kg):	-	•	-	•
Test force Rockwell (588,4N; 980,7N; 1471N (60kg; 100kg; 150kg) :	•	•	•	•
Brinell test method (indentation only, non-standard)**	•	•	•	•
Test force selection:	Manual weight exchange	Manual weight exchange	Dial switching	Dial switching
Test force application:	Semi-automatic	Semi-automatic	Automatic	Automatic
Test cycle:	Fixed 3-5-5 sec. or manual	Settable 1-99s.	Settable 1-99s.	Settable 1-99s.
LED workroom illumination	•	•	•	•
Data output: Digimatic (SPC), RS-232C	-	•	•	•
Jominy-test capability acc. to ISO 642, ISO 683-1*:**	•	•	•	•
Workpiece clamping device K543817 capability:	•	no	•	no
Display Unit:				
Display Unit:	Analog dial indicator	Matrix backlight LCD	Matrix backlight LCD	Matrix backlight LCD
GO/NG		•	•	•
Offset		•	•	•
Cylindrical compensation		•	•	•
Hardness conversion		•	•	•
Calibration mode		•	•	•
Acoustic signal for end of test, error		•	•	•
Limit indication		•	•	•
Functional dimensions				
Basic test surface Ø 64mm	•	•	•	•
Max. specimen height without spindle protection:	180,0 mm	180,0 mm	180,0 mm	180,0 mm
Max. specimen height with spindle protection attached:	100,0 mm	100,0 mm	100,0 mm	100,0 mm
Throat depth:	165 mm	165 mm	165 mm	165 mm
Max. specimen weight:	20 kg	20 kg	20 kg	20 kg
Anvil adaption:	Ø 19mm H7	Ø 19mm H7	Ø 19mm H7	Ø 19mm H7
Machine data				
Main unit dimensions:	214x512x780mm	214x512x780mm	214x512x780mm	214x512x780mm
Approx. mass main unit:	47 kg	46,3 kg	46,3 kg	46,3 kg
Power supply AC input 100-240V 1.8A DC output 12V - 4,17A	•	•	•	•

*to observe the hardness number within 0,2 HR of the scale unit, as required by ISO 6508-2, the displayed result is to be judged by the dial hand width within the step of the dial gauge scale

**optional accessories required: Brinell weight set, Brinell indenter, and a measurement microscope.

***optional accessories required

Standard Accessories:	HR-210MR	HR-320MS	HR-430MR	HR-430MS
Flat anvil Ø64mm	810-039	810-039	810-039	810-039
V-anvil outside diameter Ø40mm groove width 30mm	810-040	810-040	810-040	810-040
Water level	11AAB941	11AAB941	11AAB941	11AAB941
Vinyl cover	383876	383876	383876	383876
AC adaptor	357651	357651	357651	357651W
Indenters, reference materials, and power cord not included	•	•	•	•

For a functional system, please order additionally:		HR-210MR	HR-320MS	HR-430MR	HR-430MS
02ZAA021	Power cord 2m	•	•	•	•
Indenter		•	•	•	•
Hardness reference material		•	•	•	•

Specification

For a functional system, please order additionally:

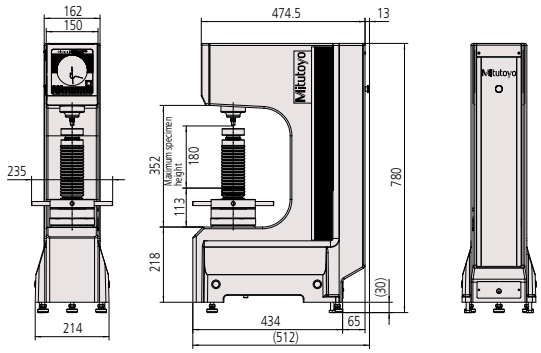
System Configuration Examples

Code Number	Description	HR-210MR	HR-320MS	HR-430MR	HR-430MS
02ZAA021	Power cord 2m	•	•	•	•
63DIA002	Diamond indenter for Rockwell test with DAkkS calibration certificate conforming to ISO 6508-2 and ASTM E18 Class B without function test	•	•	•	•
63ETB040	60HRC Rockwell Hardness Reference Material with ISO 6508-3 DAkkS calibration certificate, 60x60x16mm, steel.	•	•	•	•

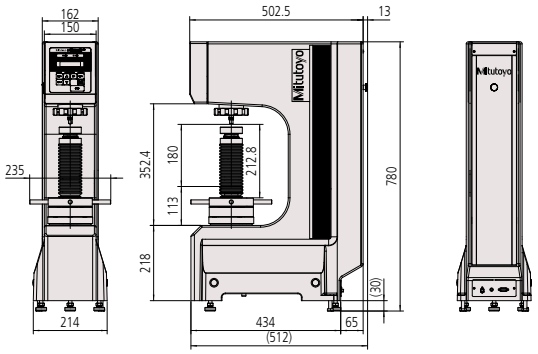
Code Number	Description	HR-210MR	HR-320MS	HR-430MR	HR-430MS
02ZAA021	Power cord 2m	•	•	•	•
11AAD465	Ball indenter for Rockwell test, 1,5875mm tungsten carbide ball without calibration certificate	•	•	•	•
63BAL013	Replacement ball for Rockwell test, 1,5875mm, tungsten carbide with DAkkS calibration certificate conforming to ISO 6508-2 and ASTM E18	•	•	•	•
63ETB1135	89HRBW Rockwell Hardness Reference Material with ISO 6508-3 DAkkS calibration certificate, 60x60x16mm, aluminium	•	•	•	•

External Dimensions

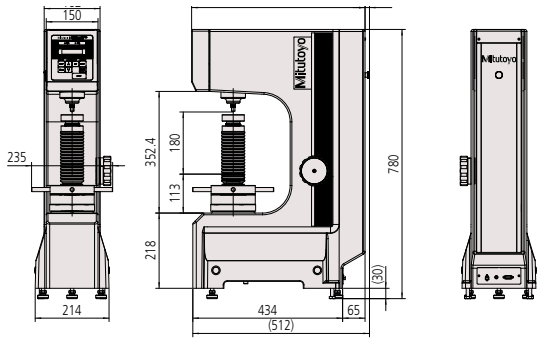
HR-210MR



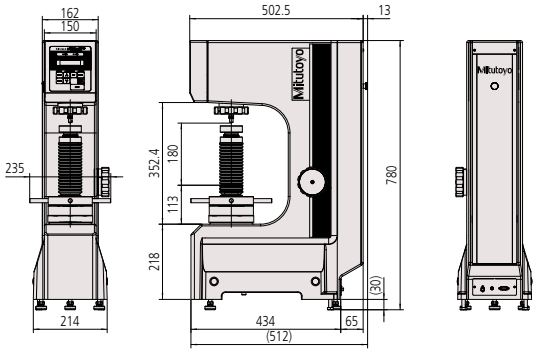
HR-320MS



HR-430MR

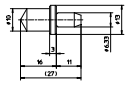
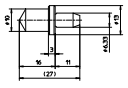
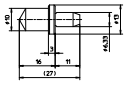
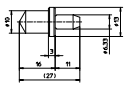
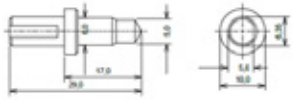


HR-430MS



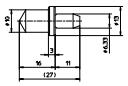
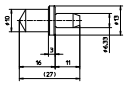
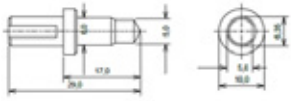
Rockwell Indenter

Rockwell indenter with function test

Code Number	Description	
Part No.: 63DIA001	Diamond Indenter Rockwell with function test acc. to table 4, HRA HRC HRD HRN ISO 6508-2 with DAkkS calibration certificate	 
Part No.: 63DIA021	Diamond Indenter Rockwell with function test acc. to table 5, HRA HRC HRD ISO 6508-2 with DAkkS calibration certificate	 
Part No.: 63DIA022	Diamond Indenter Rockwell with function test acc. to table 6, HRN ISO 6508-2 with DAkkS calibration certificate	 
Part No.: 63DIA004	Diamond Indenter Rockwell with function test, HRA HRC HRD HRN Rockwell ASTM E18 with DAkkS calibration certificate	 
Part No.: 63DIA009*	Diamond Indenter Rockwell with function test, acc. to table 3, slim type W 6 mm, HRA HRC HRD HRN ISO 6508-2 with DAkkS calibration certificate	 

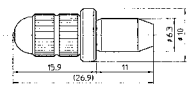
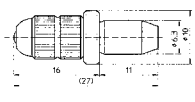
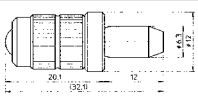
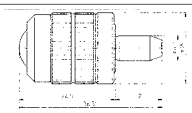
*not for use with clamping device K543817

Rockwell indenter without function test

Code Number	Description	
Part No.: 63DIA002	Diamond Indenter Rockwell without function ISO 6508-2 with DAkkS calibration certificate	 
Part No.: 63DIA023	Diamond Indenter Rockwell without function test, ISO 6508-2 ASTM E18 with DAkkS calibration certificate	 
Part No.: 63DIA024*	Diamond Indenter Rockwell without function test, slim type W 6 mm ISO 6508-2 ASTM E18 with DAkkS calibration certificate	 

*not for use with clamping device K543817

Rockwell ball indenter

Code Number	Description	
Part No.: 11AAD465	Ball indenter for Rockwell test, 1,587 5mm tungsten carbide ball without calibration certificate	 
Part No.: 11AAD466	Ball indenter for Rockwell test, 3,175mm tungsten carbide ball without calibration certificate	 
Part No.: 11AAD467	Ball indenter for Rockwell test, 6,35mm tungsten carbide ball without calibration certificate	 
Part No.: 11AAD468	Ball indenter for Rockwell test, 12,7mm tungsten carbide ball without calibration certificate	 

Rockwell Accessories

Rockwell replacement balls

Code Number	Description	Test Method 1	Standard 1	Standard 2	Calibration
19BAA507	ø1,587 5 mm Rockwell carbide ball 1pc.	Rockwell			without calibration certificate
19BAA508	ø3.175 mm Rockwell carbide ball 1pc.	Rockwell			without calibration certificate
19BAA509	ø6.35 mm Rockwell carbide ball 1pc.	Rockwell			without calibration certificate
19BAA510	ø12.7 mmRockwell carbide ball 1pc.	Rockwell			without calibration certificate
63BAL013	ø1,587 5 mm Rockwell carbide ball 1pc.	Rockwell	DIN EN ISO 6508-2	ASTM E 18	with DAkkS calibration certificate
63BAL014	ø3.175 mm Rockwell carbide ball 1pc.	Rockwell	DIN EN ISO 6508-2	ASTM E 18	with DAkkS calibration certificate
63BAL015	ø6.35 mm Rockwell carbide ball 1pc.	Rockwell	DIN EN ISO 6508-2	ASTM E 18	with DAkkS calibration certificate
63BAL016	ø12.7 mm Rockwell carbide ball 1pc.	Rockwell	ASTM E 18		with DAkkS calibration certificate

Rockwell reference materials

ROCKWELL

ISO 6508-3, ASTM E18 (option) **Dimensions: 60x60x16mm**

HRA	31	40	45	53	57	62	65	68	71	73	75	77	79	80	81	82	83	84	85
HRB	40	66	72	89	93	100													
HRC						25	30	35	40	45	50		55		60		63	65	67
HRD		10	16	28		42	48	52	56	60	62	65	67	69	71	72	73	75	76
HRE	73	91	97	106															
HRF	76	92	97	105															
HRGW			41	62															
HRKW	45	71	78	91															
HR15N				62		71	75	78	80	83	85	87	88	89	90	91		92	93
HR30N				28		43	50	56	60	64	68	71	73	76	78	79	81	82	84
HR45N				2		22	31	38	44	50	54	58	61	64	67	69	71	73	74
HR15TW	70	80	82	87	91														
HR30TW	37	57	62	72	78														
HR45TW	5	36	43	57	66														
	Aluminium					**Steel**													

Values indicated in orange are outside the application range of ISO 6508-3

High-end quality Made in Germany - Independent DAkkS calibration according to DIN EN ISO 6508 and/or ASTM E18 in an accredited laboratory Large square or rectangular surface with large space advantage over triangular or round test blocks Short delivery time MPE "Maximum Permissible Error" of the hardness testing system engraved – all relevant information at a glance. More than 700 hardness reference materials can be found in PRE 1477 and our webshop.

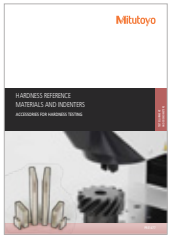
A range of additional services can be ordered:

- Up to three different scales on one reference material (Does not apply for Brinell materials)
- A lasered grid on the surface for accurate indentation spacing
- Alternative ASTM accredited calibration.
- Double calibration according to ISO and ASTM standards
- Compare the surface sizes for the evaluation of the price-performance ratio.

Please contact us if you do not find what you are looking for.

More **Info**

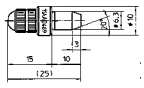
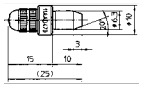
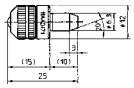
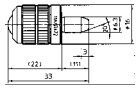
Please check QR-Codes for order number and detailed product information



Leaflet

Brinell Accessories

Brinell indenter

Code Number	Description		
Part No.: 11AAD469	Ball Indenter for Brinell test 1,0mm without calibration certificate		
Part No.: 11AAD470	Ball Indenter for Brinell test 2,5mm without calibration certificate		
Part No.: 11AAD471	Ball Indenter for Brinell test 5,0mm without calibration certificate		
Part No.: 11AAD472	Ball Indenter for Brinell test 10,0mm without calibration certificate		

Brinell replacement balls

Code Number	Description	Test Method 1	Standard 1	Standard 2	Calibration
19BAA281	ø1 mm Brinell carbide ball 1pc.	Brinell			without calibration certificate
19BAA283	ø2.5 mm Brinell carbide ball 1pc.	Brinell			without calibration certificate
19BAA162	ø5 mm Brinell carbide ball 1pc.	Brinell			without calibration certificate
19BAA163	ø10 mm Brinell carbide ball 1pc.	Brinell			without calibration certificate
63BAL009	ø1 mm Brinell carbide ball 1pc.	Brinell	ISO 6506-2	ASTM E 10	with DAkkS calibration certificate
63BAL010	ø2.5 mm Brinell carbide ball 1pc.	Brinell	ISO 6506-2	ASTM E 10	with DAkkS calibration certificate
63BAL011	ø5 mm Brinell carbide ball 1pc.	Brinell	ISO 6506-2	ASTM E 10	with DAkkS calibration certificate
63BAL012	ø10 mm Brinell carbide ball 1pc.	Brinell	ISO 6506-2	ASTM E 10	with DAkkS calibration certificate

Brinell weight sets

Brinell* scale HBW	Force-area index	Material/Range as recommended in ISO 6506-1	HR-210MR	HR-320MS	HR-430MR	HR-430MS
Weight set		**Code Number**	**63AAA194**	**63AAA193**	**63AAA192**	**63AAA191**
HBW 10/100	1	Lead Tin	•	•	•	•
HBW 5/62.5	2.5	Light metals	•	•	•	•
HBW 2.5/31.25	5	Copper and copper alloys <35 HBW		•		•
HBW 5/125		Light metals and their alloys 35 - 80 HBW	•	•	•	•
HBW 2.5/62.5	10	Cast iron <140HBW Copper and copper alloys 35 - 200 HBW Light metals and their alloys 35 - 200 HBW	•	•	•	•
HBW 1/30	30	Steel Nickel and Titanium alloys		•		•
HBW 2.5/187.5		Cast iron >140HBW Copper alloys >200HBW	•	•	•	•

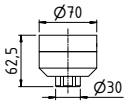
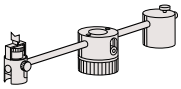
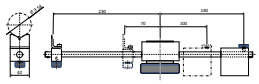
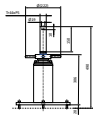
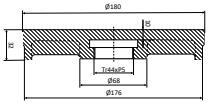
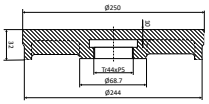
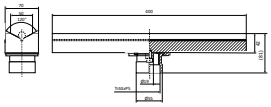
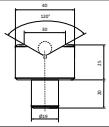
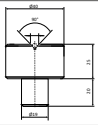
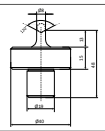
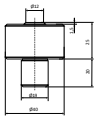
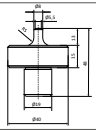
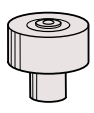
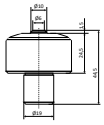
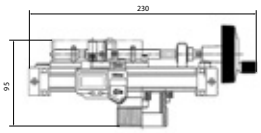
*Brinell test method not according to standard because of the preliminary test force application • without additional weight • with additional weight

Brinell microscopes

Code Number	Lens Magnification	Eyepiece Magnification	Magnification	Measuring length	Scale resolution
19BAA161D	2x	10x	20x	6,0 mm	0,1 mm
19BAA318D	4x	10x	40x	3,0 mm	0,05 mm
19BAA319D	10x	10x	100x	1,2 mm	0,01 mm

Specimen support

Accessories for specimen support

Code Number	Description			
Part No.: **K543817**	Clamping device for MR models			
Part No.: **810-027**	Adjustable support for long workpieces Leveling by counterweight adjustment Requires additional V-anvil 810-040			
Part No.: **810-028**	Height adjustable jack rest For testing long specimens using a round table or anvil Round table and anvil must be ordered separately			
Part No.: **810-037**	Round table ø180 mm. mounted on the 44mm trapeze spindle thread			
Part No.: **810-038**	Round table ø250 mm. mounted on the 44mm trapeze spindle thread			
Part No.: **810-029**	V anvil (large) (Length 400 mm, groove width 50 mm) For shaft material (Max. ø100 mm)			
Part No.: **810-040**	V-anvil, standard for shaft material Ø15,0 mm- Ø60,0 mm L40,0 mm			
Part No.: **810-041**	V anvil (small) (ø40 mm, groove width 6 mm) For shaft material (ø3 to 7 mm)			
Part No.: **810-042**	Small V anvil (ø10 mm) For shaft material (ø3 to 14 mm)			
Part No.: **810-043**	Spot anvil (ø12 mm)			
Part No.: **810-044**	Spot anvil (ø5.5 mm) For sheet metal specimens			
Part No.: **810-030**	Diamond spot anvil (ø10 mm) For HR30TSm and HR15TSm – special tests for thin sheet metal products Rockwell superficial hardness testing only!			
Part No.: **810-700**	Fine adjustment table for Jominy test Manual with digital positioning indication For evaluating steel hardenability ISO 642, ISO 683-1, ASTM A255, JIS G 0561			

Data transmission

Data transmission and Quality Management Software

Compact printer with data logger function
Digimatic Mini-Processor DP-1VA LOGGER

Order No. 264-505D
DP-1VA LOGGER

- A compact printer for statistical calculation and printing data from hardness testing machines with Digimatic output function.
- High performance with support of measurement data printing, statistical calculation, histograms, & D chart creation, as well as complex calculations required for X-R control charts.
- Up to 1,000 data items can be saved in the machine using the data logger function. All data can be transferred in one operation by connecting the printer to a computer using a USB cable (sold separately).
- The connection cable to the hardness testing machine is not plied. A connection cable sold separately is required

Printer			Required connection cable	
Code Number	Description	Option	Code Number	Description
264-505D	DP-1VA Data logger		**965013**	Connection cable (2 m) Type E

Measurement wireless data communication system
U-WAVE

- Used to import data from hardness testing machines with Digimatic output function to a computer using wireless data communication.
- Easy installation without cables that may get in the way thanks to wireless data communication (up to 20 m).
- Data can be imported to common software with keyboard input (Excel, notepad, etc.) using the data interface function of the software supplied with U-WAVE-R.
- Test results from several hardness testing machines can be imported to a single computer using simultaneous transfers from multiple U-WAVE devices.

Order No. 02AZD810D
U-WAVE-R

Order No. 02AZD880G
U-WAVE-T

Measurement data wireless communication system			Required connection cable	
Code Number	Description	Option	Code Number	Description
02AZD730G	U-WAVE-T Transmitter	•	**02AZD790E**	U-WAVE-T Connection cable 6 Pin, round
02AZD880G	U-WAVE-T Transmitter Buzzer type	•	**02AZD790E**	U-WAVE-T Connection cable 6 Pin, round
02AZD810D	U-WAVE-R Receiver		-	-

Digimatic Gauge/PC Data Input Device
USB Input Tool

- Interface used to export calculation results to spreadsheet software on a computer via a USB cable. Calculation results (values) can be exported in one operation.

USB keyboard signal converter type
Order No. 264-020
IT-020U

USB Direct Input Tool
Order No. 06AFM380E
USB-ITN-E

USB Input Tool

Digimatic Gauge/PC Data Input Device			Required connection cable	
Code Number	Description	Option	Code Number	Description
264-020	USB Input Tool Interface Box	•	**965013**	Connection cable (2 m) Type E
06AFM380E	USB Input tool direct Connection cable 6 Pin, round	•	-	-

Quality Management Software

MeasurLink®

USB-ITPAK

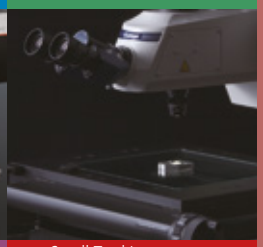
Quality Management Software			Required connection cable
Code Number	Description	Option	Description
64AAB607R	MeasurLink Real-Time Professional	•	USB Input tool or U-WAVE system
64AAB608R	MeasurLink Real-Time Professional 3D	•	USB Input tool or U-WAVE system
06AFM386	USB-ITPAK Version 2.1 Software	•	USB Input tool or U-WAVE system

Coordinate Measuring Machines

Vision Measuring Systems

Form Measurement

Optical Measuring



Sensor Systems

Test Equipment

Digital Scale and DRO Systems

Small Tool Instruments and Data Management

Whatever your challenges are, Mitutoyo supports you from start to finish.

Mitutoyo is not only a manufacturer of top quality measuring products but one that also offers qualified support for the lifetime of the equipment, backed up by comprehensive services that ensure your staff can make the very best use of the investment.

Apart from the basics of calibration and repair, Mitutoyo offers product and metrology training, as well as IT support for the sophisticated software used in modern measuring technology. We can also design, build, test and deliver measuring solutions and even, if deemed cost-effective, take your critical measurement challenges in-house on a sub-contract basis.

Find additional product literature and our complete catalog here.

www.mitutoyo.eu

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