

Weld Checkers®

Resistance welding derives it's ability to form a proper weld nugget from the simple formula for heat: $H = I^2xRxT$, where "I" is the current, "R" is the resistance, and "T" is the time. The ability to keep these variables within predefined limits allows the process to be maintained. Weld consistency can vary over time due to a number of variables, which affect the heat delivered to the weld. Monitoring your process can result in:

- High quality welds
- Improved uptime (identification of PM)
- Lower maintenance costs
- Increased revenue streams

AMADA WELD TECH's range of checkers provide the ability to monitor the variables that result in changes in weld heat such as current and time. Other factors that affect weld quality can also be monitored, such as voltage, displacement and force.

USE with all AMADA WELD TECH power supplies and other power supplies

KEY FEATURES

- ISO 17657 – compliant measurement
- Lower scrap rate through identifying weld windows
- Improved process control
- ISO 9000 data collection
- Decreased machine downtime
- Accurate machine set up
- Weld optimization and Design of Experiments (DoE)
- Welding process diagnostics



WM-200A
Industry 4.0-Ready Networked Resistance Weld Monitor

The WM-200A high resolution, high speed networked resistance weld monitor is designed to closely monitor the welding process, and capture, store, and send critical weld data to an on-premise or remotely located central server, enabling multiple users to view and analyze data from anywhere in the world in real time.

- Industry 4.0 networked to visualize manufacturing around the globe
- High speed, full waveform data acquisition and visualization for deep view into welding process in both R&D and manufacturing settings
- Standard data format outputs for easy handling in advanced data analysis software and AI/ML algorithms
- Monitor all key weld parameters simultaneously for better control of production



BASIC CONFIGURATION FOR BENCHTOP

- WM-200A Process Module
- WM-Inspect software
- Computer with display
- Server software
- Voltage lead
- Toroidal coil

KEY FEATURES

- ISO 17657 compliant current measurement
- 8 channel hardware monitoring capability
- Monitors current, 2 channels voltage, 2 channels force, 2 channels displacement, auxiliary
- High speed, full waveform data acquisition and visualization
- Collects high resolution data and stores welding process data
- Unifies global welding processes by combining data from multiple global manufacturing plants
- AI/ML ready
- Port data into 3rd party analysis software for SPC, OEE
- Remote access GUI
- Allows live view of the welding process
- Central server and databases with ODBC access to the database

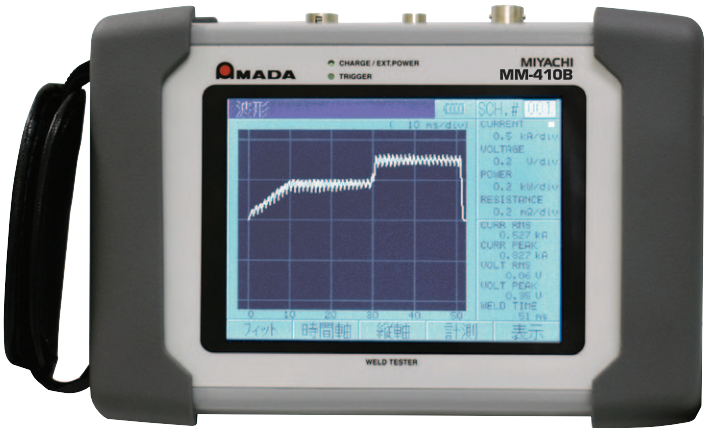
TECHNICAL SPECIFICATIONS

Measurement capability	Single channel current, dual channel voltage, force, and displacement. Single channel auxiliary 0-10 Volt input. Force and displacement sensors sold separately.	
Parameter	Ranges	Accuracy
Current **Voltage** **Displacement** **Force** **Auxiliary input**	2, 6, 20, 60, 200 kA +/- 20 V +/-15 mm, +/- 30 mm +/- 10 V +/- 10 V	1.5% of full scale +/-0.5% of reading or +/- 5 mV 0.0005 in or 0.01 mm +/-0.5% of reading or +/- 0.125 lb +/-0.5% of reading or +/- 5 mV
Derived parameters	Power and resistance	
Measurement time	5 ms - 910 seconds	
Sampling rates	200 kHz (5 µs) for all channels	
Repetition rate	3.2 per second for 50 ms measurement period, full waveform capture	
Limits	Numeric Min/Max , ISO-RMS, RMS, Mean, standard deviation, graphical envelope, counter	
Triggering	Current, voltage, force , displacement, external input	
Digital inputs	External trigger, reset error, zero displacement, reset counter, PLC control, initial thickness measurement, end of weld, weld time, schedule bits	
Digital outputs	Ready, error primary Ch 1 - 4, good, no good, no weld detect, machine error, weld count up, displacement cut off, part detect NG, PLC CTL out	
Weld counter	User programmable counter limit	
Power supply cutoff	Weld to displacement based on electrode position	
Number of schedules	Unlimited (128 addressable via I/O)	
Communications	Field Bus, Ethernet TCP/IP, Digital I/O	
Memory	1 TB local storage	
Electrical requirements	90-264 VAC 50/60 Hz	

WEIGHT & DIMENSIONS

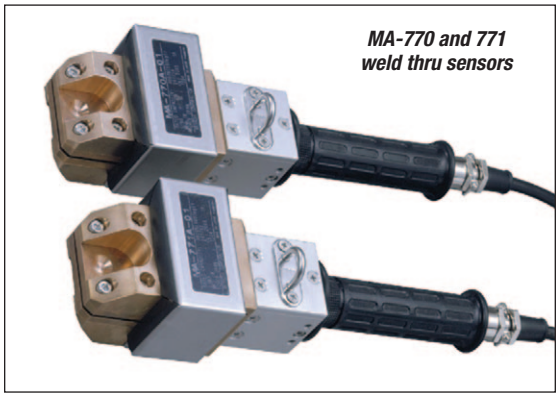
Dimensions (W x D x H)	**WM-200A**	**Display Monitor**
Enclosure closed	6 in x 13 in x 14 in (155 mm x 330 mm x 360 mm)	21.5 in display size
Weight	14.0 lb (6.35 kg)	5.5 lb (2.5 kg)

MM-410B
Next Generation Hand-held Portable Weld Checker



KEY FEATURES

- Improved accuracy through ISO 17657 compliant torroidal coil
- Easy setup via 5.7" color touch panel
- Seam welding mode – Monitor AC current and voltage or DC voltage for up to 5 minutes
- ISO 17657 – compliant measurement for current – Requires ISO-compliant toroidal coil
- Data storage via on-board flash drive
- Ethernet (TCP/IP), and USB communication
- Multi-language support: English, Spanish, Japanese, Chinese, Korean, German and French



MA-770 and 771 weld thru sensors

Measure current, voltage and force
Understand, optimize and benchmark your process and equipment

Weld through sensor
Measure force, current and voltage simultaneously at the electrodes

Easy screen navigation
Scroll through and select menus with rotary dial

Waveform and data analysis
Precise graphical displays of waveform time and amplitude

Communication
Ethernet TCP/IP and USB

ACCESSORIES



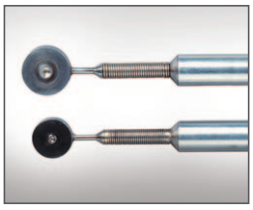
Toroidal coil
MB-400P
(ISO 17657-compliant)



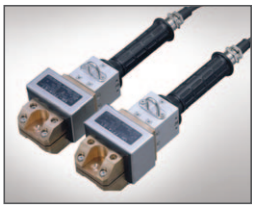
Toroidal coil
MB-800P
(ISO 17657-compliant)



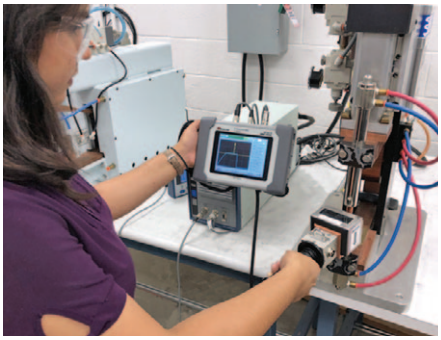
Toroidal coil
MB-45G *(10x sensiltivity)*
(conversion cable SK-1193305 is required)



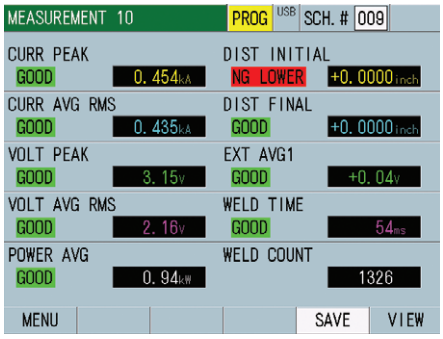
Force sensors
Top: MA-522B
Bottom: MA-521B/MA-520B
Current / force sensor



MA-770A / MA-771A
(conversion cable SK-1200918 is required)



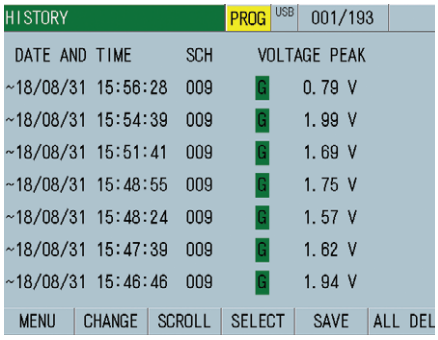
MM-410 with weld through sensor MA-771A



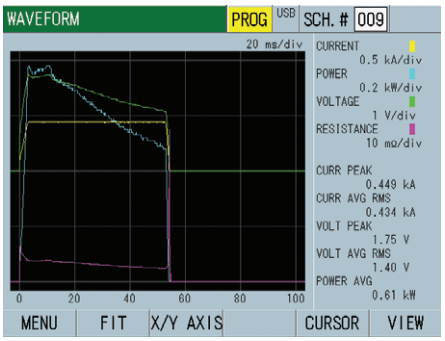
Measurement screen



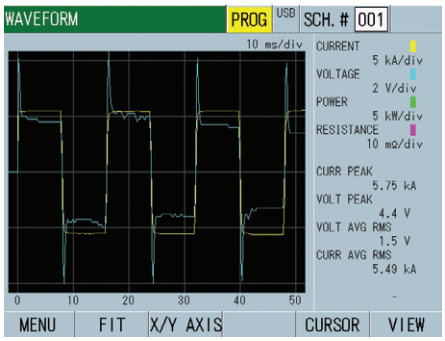
Force and current timing



Weld history



Current, voltage, power, resistance



Zoom of current and voltage (AC Inverter)

TECHNICAL SPECIFICATIONS

MODEL			MM-410B			
Current	Range		1×Sensitivity toroidal coil: 0.100-2.000 kA / 0.30-6.00 kA / 1.00-20.00 kA / 3.0-60.0 kA / 10.0-200.0 kA			
			10×Sensitivity toroidal coil: 0.010-0.200 kA / 0.030-0.600 kA / 0.100-2.000 kA / 0.30-6.00 kA / 01.00-20.00 kA			
	Item		PEAK / RMS* / Arithmetic mean RMS		Accuracy	±1% Full scale
Voltage	Range		0.30-6.00 V / 1.0-20.0 V		Accuracy	±1% Full scale
	Item		PEAK / RMS* / Arithmetic mean RMS			
Force	Range		4.90-98.06 N (MA-520B), 49.0-980.6N (MA-521B), 245-4903 N (MA-770A), 490-9806 N (MA-522B, MA-771A)			
	Item		Mean RMS/maximum (peak) Before welding / After welding / Constant		Accuracy	±3% Full scale
External	Input voltage / current range		-10 to +10 V / 4 to 20 mA			
	Range		±0.5 to 10 V or 4.8 to 20 mA (5% to 100% of rated setting)			
	Item		Mean RMS/maximum (peak) Before welding / After welding / Constant		Accuracy	±3% Full scale
	Units		V / N / kgf / lbf / °C / °F / Mpa / bar / psi			
Measurement time	Current Voltage Power Resistance	AC	ms-AC CYC-AC CYC***Hz-AC LONG CYC-AC	1-5000ms 0.5-250.0CYC (50 Hz), 0.5-300.0CYC (60 Hz) 0.5-200.0CYC (M050: 50 Hz), 0.5-300.0CYC (M063: 63Hz), 0.5-2000.0CYC (M500: 500 Hz) 0.5-500.0CYC (50 Hz), 0.5-600.0CYC (60 Hz)		
		DC	CYC-DC ms-DC SHORT ms-DC	0.5-100.0CYC (50 Hz), 0.5-120.0CYC (60 Hz) 1-2000 ms 0.50-300.00 ms (0.05 ms increment)		
	Force external		1 to 10000 ms		Accuracy	±9 degrees
Conduction angle			0-180 degrees			
Power supply voltage			Single-phase 100 to 240 V (50/60 Hz) AC adapter output 9 V DC			
External data output			USB / Ethernet (Protocol; TCP/IP)			
Languages			Japanese, English, Chinese, Korean, German, French, Spanish			
No. of schedules			127 schedules			

WEIGHT & DIMENSIONS

Dimensions (W x D x H)	8.82 in x 1.85 in x 6.18 in (224 mm x 47 mm x 157 mm)
Weight	Approx. 1.98 lb (0.9 kg)

MM-400B
Machine Mounted Weld Monitor



KEY FEATURES

- Seam monitoring mode
- Pre-weld part detection
- Measures current, voltage, force and displacement, weld time for spot welding
- Set limits for all parameters using the envelope function
- Comprehensive machine I/O
- Measured data and waveform data can be saved in a USB memory device
- Easy screen-menu navigation
- Built-in printer and RS232C/485/Ethernet TCP/IP
- Multilanguage support
- Measurement based on ISO17657 standard
- Touchscreen programming
- Successor to MM-370C and MM-400A
- Supports wide range of resistance welding power supplies - Linear DC, DC inverter, AC inverter, transistor and capacitive discharge

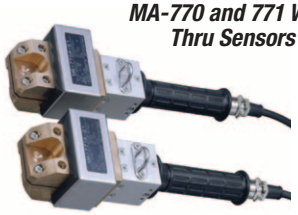
ACCESSORIES



Coils



Displacement Sensor



MA-770 and 771 Weld Thru Sensors

TECHNICAL SPECIFICATIONS

Current range	0.010 to 200.0 kA
Force range (MM-400B)	MA-770A-01: 55 to 1102 lbf, (25 to 500 kgf) MA-771A-01: 110 to 2204 lbf, (50 to 1000 kgf); MA-520B: 1.10 to 22.04 lbf, (0.50 to 10.00 kgf) MA-521B: 11.0 to 220.4 lbf, (5.0 to 100.0 kgf); MA-522B: 110 to 2204 lbf, (50 to 1000 kgf)
Displacement range	LGK-110, 10mm, 1 micron accuracy; LGF-125L-B, 25mm, 1 micron accuracy GS-1813 A: 0 - 13 mm, 1 micron accuracy; GS-1830 A: 0 - 30 mm, 1 micron accuracy (GS-1813/1830A require SK-1194374 conversion cable)
Voltage range	0.30 to 20.0 V
Current measurement time	AC current, cycles: 0.5 to 600.0 cycles at 60 Hz ; AC current, ms: 1 to 5000 ms DC current, cycles: 0.5 to to 120.0 cycles at 60 Hz; DC current, ms: 1 to 2000 ms
Force measurement time	1 to 10000 ms
Measurement mode for voltage and current	Arithmetic mean RMS or maximum, (peak)
Data output	Data can be acquired using the built-in printer, USB port, standard RS-232/RS-485 port, or Ethernet TCP/IP port
Number of schedules	127
Power requirements	100 to 240 VAC, 50/60 Hz, 40 W

WEIGHT & DIMENSIONS

Dimensions (W x D x H)	6.8 in x 10.5 in x 11.3 in (172 mm x 266 mm x 288 mm) excluding protrusions
Weight	11 lb (5 kg)

MM-123A
High Precision “Miniature” Weld Monitor

KEY FEATURES

- Measures single phase AC, DC inverter, AC inverter, capacitor discharge, transistor, single-phase rectified, 3-phase rectified, 3-phase low frequency
- Monitors current, voltage, and time
- Current Range: 0.100 – 200.0 kA
- Voltage Range 0.3 V to 20.0 V
- RMS or PEAK values
- Conduction angle
- Measures time in milliseconds and cycles
- Upper and lower limits
- 31 weld schedules
- Data communications via Ethernet port
- “No weld current” detection
- Error signaling
- Analog output for waveforms
- Weld counter
- Measures stepped weld sequences
- Good/No-Good, Hi/Low machine outputs



The new standard in weld checker technology.

The MM-123A is the very latest in stand-alone weld checker technology. This full function, cost effective unit is designed to monitor every type of welding control. The unit’s “miniature” design allows it to be mounted in any position on the welding machine. Limits for Peak or RMS current and voltage provide vital weld quality indicators. Multiple schedules, error signaling and versatile I/O make this unit as valuable for bench systems as it is for automated welding systems. Ethernet port provides for data collection and weld process analysis, critical in today’s advanced manufacturing processes.

TECHNICAL SPECIFICATIONS

Power supply	Single Phase 100 – 240 VAC ±10% 50/60 Hz or 24 VDC ±10%
Current sensor	Toroidal coil (see table in this brochure)
Current range	0.100~2.000 kA, 01.00~20.00 kA, 010.0~200.0 kA
Voltage range	0.3 V to 20.0 V
Monitored value	RMS or PEAK
Time range	1-2000 ms (DC) 1-3000 ms (AC) 0.5 to 180 cycles (AC 60 Hz)
Conduction angle	30°–180°
Data output	Ethernet TCP/IP

WEIGHT & DIMENSIONS

Dimensions (W x D x H)	2.8 in x 9.7 in x 7.5 in (70 mm x 246 mm x 190 mm)
Weight	4.2 lb (1.9 kg)

MM-315B
Pocket Weld Testers

KEY FEATURES

- Simple current measurement in the palm of your hand
- For AC and Inverter power supplies
- Measures current, cycles, milliseconds and conduction degrees
- Impulse memory, 9 welds
- Rechargeable batteries or AC
- Includes coil, charger and carrying case
- Easy-view LCD
- Memory function for easy recall of impulses



The perfect pocket size troubleshooter.

TECHNICAL SPECIFICATIONS

Power supply	Rechargeable battery and AC charger
Current sensor	Toroidal coil (see table in this brochure)
Current range	1.00-9.99A, 5.0-49.9kA
Time range	1 – 99 cycles or 0.01 – 0.80 sec
Conduction angle	30° – 180°

WEIGHT & DIMENSIONS

Dimensions (W x D x H)	2.95 in x 1.18 in x 6.7 in (75 mm x 30 mm x 170 mm)
Weight	1.1 lb (0.5 kg)

ELECTRONIC FORCE GAUGE



Portable force setting and verification tool.

MM-601A

KEY FEATURES

- Simple and accurate handheld force measurement
- Hold and zero functions
- One touch tare setting
- Rechargeable batteries or AC
- External I/O for analog out and measurement hold
- Easy-view LCD
- Analog force output

TECHNICAL SPECIFICATIONS

Power supply	Rechargeable battery and AC charger
Force sensor	MA-520: 1.10 to 22.04 lbf (0.50 to 10.00 kgf) MA-521: 11.0 to 220.4 lbf (5.0 to 100.0 kgf) MA-522: 110 to 2204 lbf (50 to 1000 kgf)
Accuracy	±3% full scale
Measurement speed	Approx. 4 times per second

WEIGHT & DIMENSIONS

Dimensions (W x D x H)	2.95 in x 1.18 in x 6.7 in (75 mm x 30 mm x 170 mm)
Weight	1.1 lb (0.5 kg)

TOROIDAL COILS



- For use with all current monitors.

MB-400K	400 mm long 1.0 x sensitivity, 5 in I.D.* (127 mm)
MB-800K	800 mm long 1.0 x sensitivity, 10 in I.D. (254 mm)
MB-29F	10 x sensitivity, 1⅛ in I.D. (29 mm)
MB-35E	1.0 x sensitivity, 1⅜ in I.D. (35 mm)
MB-45F	10 x sensitivity, 1¾ in I.D. (45 mm)
MB-60E	1.0 x sensitivity, 2⅜ in I.D. (60 mm)
MB-500-15	500 mm long 1.0 x sensitivity, 3 in I.D. (76 mm)

*Inner diameter
Extension cables for toroidal coils are optional.
These coils connect directly with MM-315 and MM-123A, use with MM-400A, MM-410A requires conversion cable SK-1193305

ISO TOROIDAL COILS

- MB-400M used with MM-400A (ISO17657 compliant)
- MB-400P used with MB-400B (ISO17657 compliant)
- MB-800M used with MM-410A (ISO17657 compliant)
- MB-800P used with MB-410B (ISO17657 compliant)

FORCE SENSORS & ACCESSORIES



FORCE AND CURRENT SENSORS

Part Number	Description	Product
MA-520/MA-520B	Force sensor 1.10 to 22.04 lbf (0.50 to 10.00 kgf)	MM-601A/MM-400A, MM-410A
MA-521/MA-521B	Force sensor 11.0 to 220.4 lbf (5.0 to 100.0 kgf)	MM-601A/MM-400A, MM-410A
MA-522/MA-522B	Force sensor 110 to 2204 lbf (50 to 1000 kgf)	MM-601A/MM-400A, MM-410A
MA-770A	Force sensor 55 to 1102 lbf, (25 to 500 kgf)	MM-400A, MM-410A
MA-771A	Force sensor 110 to 2204 lbf, (50 to 1000 kgf)	MM-400A, MM-410A

*MA-520/521/522B for use with MM-400, MM-410 only
**MA-520/521/522 for use with MM-601, can be used with MM-400/410, required conversion cable SK-1200686

ACCESSORIES

Part Number	Description	Product
145-013	Rechargeable battery, 1.2 V 500MAH (4 required for checker)	MM-315B, MM-601A
TP-50KM-A60	Printer paper, 60 mm x 25 mm (W x L)	MM-400A optional printer
18-042-01	Toroidal coil extension (specify length)	MM-123A and MM-315B only
SK-1194040	Toroidal coil extension (5 meters)	MM-400A and MM-410A only
SK-1194041	Toroidal coil extension (10 meters)	MM-400A and MM-410A only
SK-1194042	Toroidal coil extension (20 meters)	MM-400A and MM-410A only

DATA COLLECTION SOFTWARE – WINWEDGE®

Taltech™ Winwedge software can be used to collect data from most checker models. AMADA WELD TECH has written some front-end programs that accept basic data to start you on the road to process control and data collection. Exports data directly into Microsoft Excel®

Applicable Models	MM-123A, MM-400A, MM-410A
Part Number	10-900-02

MODEL	WM-200A	MM-123A	MM-315B	MM-400A	MM-410A	MM-601A
Current		✓	✓	✓	✓	–
Voltage		✓	–	✓	✓	–
Time		✓	✓	✓	✓	✓
Force		–	–	✓	✓	✓
Displacement		–	–	–	–	–
Schedules		31	–		127	–
Stand-alone		✓	–	✓	–	–
Hand held		–	✓	–	✓	✓
Pocket		–	✓	–	–	✓
Communications		232/485	–	USB/Ethernet RS232/485	USB/Ethernet	–
Printer		Option	–	✓	–	–
Battery powered		–	✓		✓	✓
Line powered		✓	✓	✓	✓	✓
ISO17657 measurement				✓	✓	

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