

# Weld Checkers®



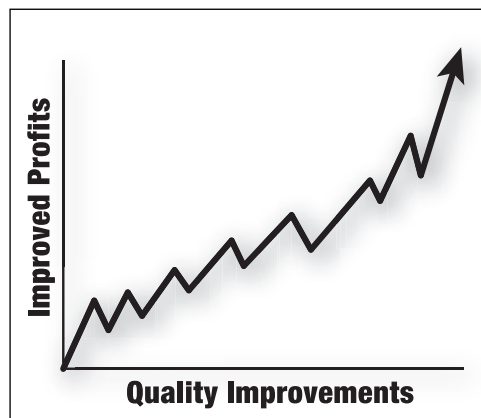
Resistance welding derives its ability to form a proper weld nugget from the simple formula for heat:  $H = I^2 \times R \times T$ , where “I” is the current, “R” is the resistance, and “T” is the time. The ability to keep these variables within predefined limits allows the process to be maintained. Weld consistency can vary over time due to a number of variables, which affect the heat delivered to the weld. The changes can result in:

- Poor quality welds
- Machine downtime
- High maintenance costs
- Lost revenue

Amada Miyachi America’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.

## KEY FEATURES

- Lower scrap rate
- Improved process control
- ISO 9000 data collection
- Decreased machine downtime
- Accurate machine set up
- Weld optimization and Design of Experiments (DoE)
- Welding process diagnostics

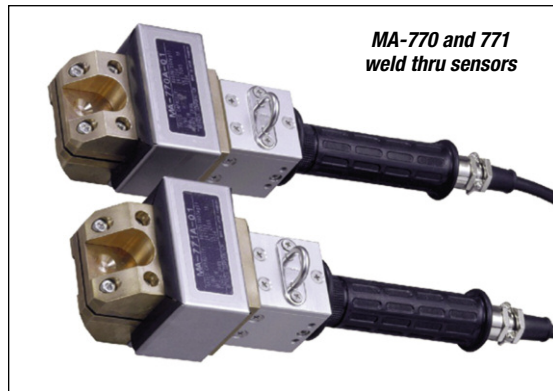


## MM-380

### Next Generation Hand-held Portable Weld Checker

#### KEY FEATURES

- Measures current, voltage and force, resistance, weld time
- Weld-through sensor
- Easy screen-menu navigation
- Intuitive waveform and data analysis
- Printer and RS232 output



#### **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

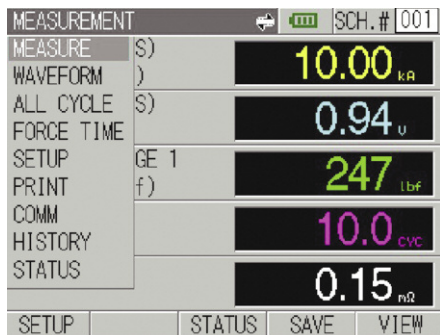
#### **Printer option**

Instant screen prints and waveforms

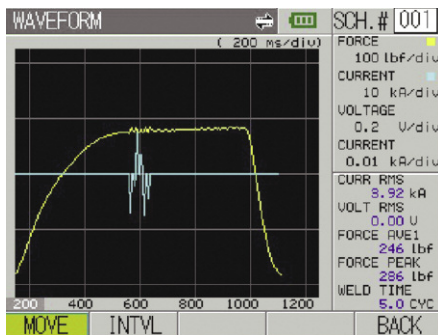
#### **RS232 output**

Color screen capture and data collection through COM port





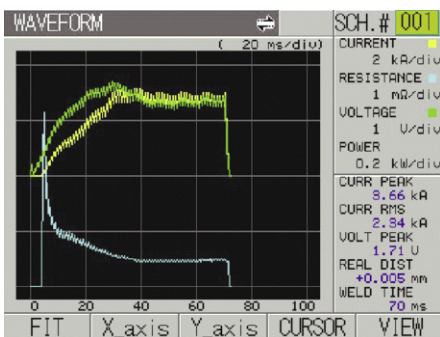
Drop-down menu navigation



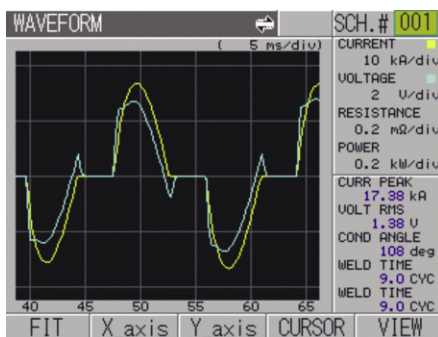
Force and current timing

DATE	TIME	SCH	CURRENT (RMS)
~ 06/15	16:28:54	001	10.00 kA
~ 06/15	16:28:46	001	10.03 kA
~ 06/15	16:28:39	001	9.94 kA
~ 06/15	16:28:33	001	10.13 kA
06/15	16:28:27	001	9.82 kA
06/15	16:28:22	001	9.69 kA
06/15	16:28:16	001	8.70 kA
06/15	16:28:10	001	8.22 kA
06/15	16:26:50	001	7.93 kA

Weld history



Current, voltage and resistance



Zoom of current and voltage

## ACCESSORIES



## TECHNICAL SPECIFICATIONS

<b>Current Range</b>	0.010 to 200.0 kA
<b>Force range</b>	MA-770A-01: 55 to 1102 lbf, (25 to 500 kgf) MA-771A-01: 110 to 2204 lbf, (50 to 1000 kgf) 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)
<b>Voltage range</b>	0.30 to 20.0 V
<b>Current measurement time</b>	AC current, cycles: 0.5 to 600.0 cycles at 60 Hz ; AC current, ms: 1 to 2000 ms DC current, cycles: 0.5 to 120.0 cycles at 60 Hz; DC current, ms: 1 to 2000 ms
<b>Force measurement time</b>	1 to 6000 ms
<b>Measurement mode for voltage and current</b>	Arithmetic mean RMS or maximum, (peak)
<b>Data output</b>	RS-232 and optional external printer
<b>Number of schedules</b>	127
<b>Power requirements, (AC adapter)</b>	100 - 240 VAC, 50/60 Hz
<b>Battery operation time</b>	Approximately 2 hours with 1 battery, 4 hours with 2 batteries. 1 battery included.

## WEIGHT & DIMENSIONS

<b>Dimensions L x W x H</b>	2.2 in x 5.5 in x 9.9 in (56 mm x 140 mm x 252 mm) excluding protrusions
<b>Weight</b>	2 lb (0.9 kg)



## KEY FEATURES

- Envelope function allows the operator to set upper and lower segmented or continuous limits around the entire waveform
- Seam welding mode- Monitor AC current and voltage or DC voltage for up to 5 minutes
- ISO17657-compliant measurement for current  
-Requires ISO-compliant toroidal coil
- Ethernet (TCP/IP), and RS-232/485 communication
- Pre-weld displacement measures workpiece thickness prior to welding and supplies OK/ NG output
- Multi-language support: English, Spanish, Japanese, Chinese, Korean, German and French

# MM-400A

## Desktop Resistance Weld Checker

MM-400A enables operators to monitor and manage key welding variables that result in changes in weld heat such as current, voltage, time, force and displacement. The compact unit supports a wide range of resistance welding technologies including AC, DC inverter, AC inverter, transistor and capacitive discharge. It features a simple and intuitive user interface and color touch panel display.

### COMMON APPLICATIONS:

#### Process Development

- Correlate waveform and numeric data with process results
- Provides detailed weld data for process optimization and validation

#### Production Environment

- Reduces scrap
  - Detects drifts in the weld process and alerts operators before process failure
- Reduces frequency of destructive testing
  - Welds that pass the set parameter limits indicate the process is in control
- Independent monitoring of welding power supply
  - Detects drifts in welding power supply calibration.



## ACCESSORIES



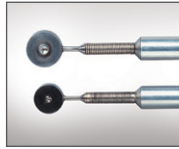
**Toroidal coil**  
MB-400M/MB-800M



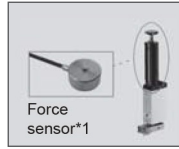
**MB-45F**



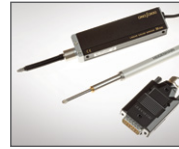
**Shunt resistor**



**Force sensors**  
Top: MA-522  
Bottom: MA-521/  
MA-520



**Built-in force sensor**



**Displacement sensors**



**Weld thru sensor**  
MA-770A MA-771A  
Simultaneous  
measurement of  
applied force

## TECHNICAL SPECIFICATIONS

MODEL(S)		3-400-01 (Basic) 3-400-02 (Force and displacement)	
<b>Current</b>	<b>Range</b>	1x 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 (MB-400 M/800 M) 10x sensitivity toroidal coil~0.01~0.2 kA/0.03~0.6 kA/0.1~2.0 kA/0.3~6.0 kA/1.0~20.0 kA (MB-45F) Shunt resistor~0.025 kA~0.5 kA/0.05~1.0 kA	
	<b>Measurement</b>	PEAK/RMS*2 / Arithmetic mean RMS. Accuracy $\pm 1\%$ Full scale	
<b>Voltage</b>	<b>Range</b>	0.30~6.00 V/1.0~20.0 V. Accuracy $\pm 1\%$ Full scale	
	<b>Measurement</b>	PEAK/RMS*2 / Arithmetic mean RMS. Accuracy $\pm 1\%$ Full scale	
<b>Displacement*1</b>	<b>Range</b>	When the SENSOR STEP setting is 1 $\mu\text{m}$ : $\pm 30.000$ mm. Accuracy $\pm 30.000$ mm range: $\pm 15$ $\mu\text{m}$ (sensor with 1 $\mu\text{m}$ or less resolution) When the SENSOR STEP setting is 10 $\mu\text{m}$ : $\pm 300.00$ mm. Accuracy $\pm 300.00$ mm range: $\pm 150$ $\mu\text{m}$ (sensor with 10 $\mu\text{m}$ or less resolution)	
	<b>Measurement</b>	Before welding / After welding / Constant	
<b>Force*1</b>	<b>Range</b>	0.49~98.06 N (MA-520) / 0.49~980.6 N (MA-521) / 245~4903 N (MA-770) $\pm 3\%$ Full scale	
	<b>Measurement</b>	Mean RMS / maximum (peak) Before welding / After welding / Constant. Accuracy $\pm 3\%$ Full scale	
	<b>Input voltage / current range</b>	-10 to +10 V / 4 to 20 mA	
<b>External</b>	<b>Range</b>	5% to 100% of rated setting	
	<b>Measurement</b>	Mean RMS/maximum (peak) Before welding / After welding / Constant. Accuracy $\pm 3\%$ Full scale	
<b>Measurement time</b>	<b>Current</b>	<b>AC</b>	ms-AC CYC-AC CYC***Hz-AC LONG CYC-AC
		<b>DC</b>	CYC-DC ms-DC SHORT ms-DC
	<b>Voltage</b>	<b>AC</b>	1 to 5000 ms 0.5 to 250.0 CYC (50 Hz) 0.5 to 300.0 CYC (60 Hz) 0.5 to 200.0 CYC (M050 : 50Hz) 0.5 to 300.0CYC (M063 : 63 Hz) 0.5 to 2000.0 CYC (M500 : 500 Hz) 0.5 to 500.0 CYC (50 Hz) 0.5 to 600.0 CYC (60 Hz)
		<b>DC</b>	0.5 to 100.0 CYC (50 Hz) 0.5 to 120.0 CYC (60 Hz) 1 to 2000 ms 0.50 to 100.00 ms (0.05 ms increment)
<b>Displacement</b>	<b>DC</b>	1 to 10000 ms	
<b>Power</b>	<b>DC</b>	1 to 10000 ms	
<b>Resistance</b>	<b>DC</b>	1 to 10000 ms	
<b>Force external</b>	<b>DC</b>	1 to 10000 ms	
<b>Conduction angle</b>	0 to 180 degrees. Accuracy $\pm 9$ degrees		
<b>Units</b>	V / N / kgf / lbf / °F / Mpa / bar / psi		
<b>Input power</b>	Single-phase 100 to 240 VAC $\pm 10\%$ (50/60 Hz) or 24 VDC+/-10%		
<b>External data output</b>	RS-232C/RS-485/Ethernet		
<b>Languages</b>	Japanese, English, Chinese, Korean, German, French, Spanish		
<b>No. of schedules</b>	127		
<b>Power usage</b>	41 W (49 W with printer running)		

\*1 Force and displacement model only \*2 ISO17657 compliant

## WEIGHT &amp; DIMENSIONS

<b>Dimensions (L x W x H)</b>	31.2 in x 17.4 in x 33.9 in (290 mm x 172 mm x 269 mm (excluding protrusions))
<b>Weight</b>	Approx. 11 lb (5 kg)

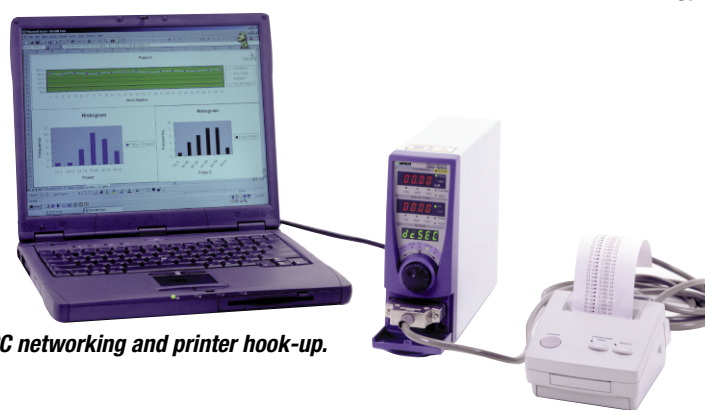
# MM-122A High Precision "Miniature" Weld Monitor

## KEY FEATURES

- Measures single phase AC, DC inverter, AC inverter, capacitor discharge, transistor, single-phase rectified, 3-phase rectified, 3-phase low frequency
- Current Range: 0.010 – 199.9kA
- RMS or PEAK values
- Conduction angle
- Measures time in milliseconds and cycles
- Upper and lower limits
- 31 weld schedules
- Data communications port RS-232/485
- "No weld current" detection
- Error signaling
- Printer connection with standard reports
- Analog output for waveforms
- Weld counter
- Measures stepped weld sequences
- Good/No-Good, Hi/Low machine outputs



*The new standard in weld checker technology.*



*PC networking and printer hook-up.*

The MM-122A 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 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. Printer options or RS-232/485 provide for data collection and weld process analysis, critical in today's advanced manufacturing processes.

<pre>SCHEDULE 01 CURRENT LOW : 0.500 KA CURRENT HIGH : 0.600 KA WELD TIME LOW : 9 ms WELD TIME HIGH : 11 ms FIRST TIME : 5 ms LAST TIME : 30 ms RANGE : 1.999 KA PEAK/RMS : RMS PULSATON : 0  SCHEDULE 02 CURRENT LOW : 0.000 KA CURRENT HIGH : 1.999 KA WELD TIME LOW : 20 ms WELD TIME HIGH : 30 ms FIRST TIME : 0 ms LAST TIME : 2000 ms RANGE : 1.999 KA PEAK/RMS : RMS PULSATON : 0  SCHEDULE 03 CURRENT LOW : 0.200 KA CURRENT HIGH : 0.300 KA WELD TIME LOW : 90 ms WELD TIME HIGH : 100 ms</pre>	<pre>SCHEDULE F : 01 CURRENT (RMS) : 0.087 KA CURRENT (PEAK) : 0.888 KA WELD TIME : 31 ms COUNT : 00117 WELD TIME CURR (RMS) 1 ms# 0.853 KA 2 ms# 0.719 KA 3 ms# 0.711 KA 4 ms# 0.711 KA 5 ms# 0.710 KA 6 ms# 0.707 KA 7 ms# 0.707 KA 8 ms# 0.708 KA 9 ms# 0.708 KA 10 ms# 0.708 KA 11 ms# 0.708 KA 12 ms# 0.708 KA 13 ms# 0.708 KA 14 ms# 0.708 KA 15 ms# 0.708 KA 16 ms# 0.702 KA 17 ms# 0.702 KA 18 ms# 0.702 KA 19 ms# 0.702 KA 20 ms# 0.705 KA 21 ms# 0.703 KA 22 ms# 0.702 KA</pre>	<pre>COUNT SCH CURR KA TIME ms 00079 01 0.888# 21 00080 01 0.888# 21 00081 01 0.883# 21 00082 01 0.882# 21 00083 01 0.889# 21 00084 01 0.882# 21 00085 01 0.882# 21 00086 01 0.882# 21 00087 01 0.882# 21 00088 01 0.882# 21 00089 01 0.882# 21 00090 01 0.882# 21 00091 01 0.882# 21 00092 01 0.882# 21 00093 01 0.882# 21 00094 01 0.882# 21 00095 01 0.882# 21 00101 01 0.882# 21 00102 01 0.881# 21 00103 01 0.880# 21 00104 01 0.884# 21 00105 01 0.882# 21</pre>	<pre>COUNT SCH CURR KA TIME ms 00119 01 0.882# 31</pre>
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*Millisecond readings      Schedule info      Error only or all summary data      Hi/low indication*

## TECHNICAL SPECIFICATIONS

<b>Power supply</b>	Single Phase 100 – 240 VAC ±10% 50/60 Hz or 24 VDC ±10%
<b>Current sensor</b>	Toroidal coil (see table in this brochure)
<b>Current range</b>	0.010-0.199 kA (X10 coil), 0.100-1.999 kA, 1.00-19.99 A, 10.0-199.9 kA
<b>Monitored value</b>	RMS or PEAK
<b>Time range</b>	0.5 to 500.0 cycles (AC and DC), 1-2000 mS (AC and DC), 0.50-25.00 mS (transistor) 0.50 9.99 mS / 05.0-99.9 mS (capacitor) Tp, Th
<b>Conduction angle</b>	30°–180°
<b>Data output</b>	RS-232 / 485 or optional printer

## WEIGHT & DIMENSIONS

<b>Dimensions (L x W x H)</b>	9.7 in x 2.8 in x 7.5 in ( 246 mm x 70 mm x 190 mm)
<b>Weight</b>	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

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

### WEIGHT & DIMENSIONS

<b>Dimensions L x W x H</b>	1.18 in x 2.95 in x 6.7 in (30 mm x 75 mm x 170 mm)
<b>Weight</b>	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

<b>Power supply</b>	Rechargeable battery and AC charger
<b>Force sensor</b>	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)
<b>Accuracy</b>	±3% full scale
<b>Measurement speed</b>	Approx. 4 times per second

### WEIGHT & DIMENSIONS

<b>Dimensions (L x W x H)</b>	1.18 in x 2.95 in x 6.7 in (30 mm x 75 mm x 170 mm)
<b>Weight</b>	1.1 lb (0.5 kg)

## TOROIDAL COILS



<b>MB-400K</b>	400 mm long 1.0 x sensitivity, 5 in I.D.* (127 mm)
<b>MB-800K</b>	800 mm long 1.0 x sensitivity, 10 in I.D. (254 mm)
<b>MB-29F</b>	10 x sensitivity, 1 1/8 in I.D. (29 mm)
<b>MB-35E</b>	1.0 x sensitivity, 1 1/8 in I.D. (35 mm)
<b>MB-45F</b>	10 x sensitivity, 1 3/8 in I.D. (45 mm)
<b>MB-60E</b>	1.0 x sensitivity, 2 3/8 in I.D. (60 mm)
<b>MB-500-15</b>	500 mm long 1.0 x sensitivity, 3 in I.D. (76 mm)

Extension cables for toroidal coils are optional.

\*Inner diameter

- For use with all current monitors.

## FORCE SENSORS & ACCESSORIES



### FORCE AND CURRENT SENSORS

Part Number	Description	Product
<b>MA-520</b>	Force sensor 1.10 to 22.04 lbf (0.50 to 10.00 kgf)	MM-601A, MA-770A-01, MA-771A-01
<b>MA-521</b>	Force sensor 11.0 to 220.4 lbf (5.0 to 100.0 kgf)	MM-601A, MA-770A-01, MA-771A-01
<b>MA-522</b>	Force sensor 110 to 2204 lbf (50 to 1000 kgf)	MM-601A, MA-770A-01, MA-771A-01

### ACCESSORIES

Part Number	Description	Product
<b>145-013</b>	Rechargeable battery, 1.2 V 500MAH (4 required for checker)	MM-315B, MM-601A
<b>TP-50KM-A60</b>	Printer paper, 60 mm x 25 mm (W x L)	MM-370A, MM-380A optional printer
<b>18-042-01</b>	Toroidal coil extension (specify length)	All checkers

## DATA COLLECTION SOFTWARE – WINWEDGE®

Taltech™ Winwedge software can be used to collect data from most checker models. Amada Miyachi America 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®

<b>Applicable Models</b>	MM-122A*, MM-370A, MM-380A
<b>Part Number</b>	10-900-02

\*MM-122A has its own software – MA-716A



MODEL	MM-122A	MM-315B	MM-370A	MM-380A	MM-601A
Current	✓	✓	✓	✓	–
Voltage	–	–	✓	✓	–
Time	✓	✓	✓	✓	✓
Force	–	–	✓	✓	✓
Displacement	–	–	✓	–	–
Schedules	31	–	127	127	–
Stand-alone	✓	–	✓	–	–
Hand held	–	✓	–	✓	✓
Pocket	–	✓	–	–	✓
Communications	232/485	–	232/485	232	–
Printer	Option	–	✓	Option	–
Battery powered	–	✓	–	✓	✓
Line powered	✓	✓	✓	✓	✓



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