Weld Checkers®

Resistance welding derives it's ability to form a proper weld nugget from the simple formula for heat: H = I2xRxT, 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.

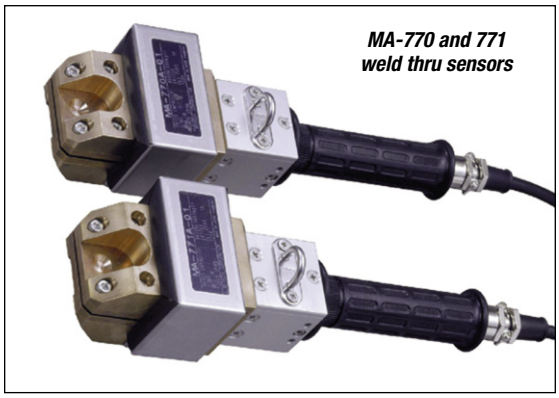
KEY FEATURES

- 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



MA-770 and 771 weld thru sensors

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

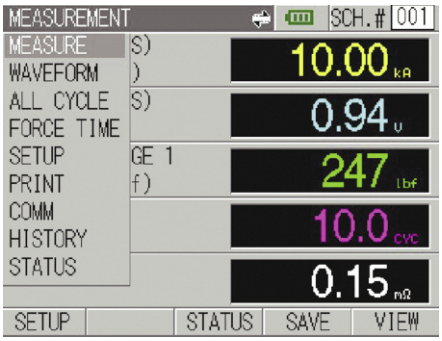
Weld through sensor
Measure force, current and voltage simultaneously at the electrodes

Easy screen navigation
Scroll through and select menus with rotary dial

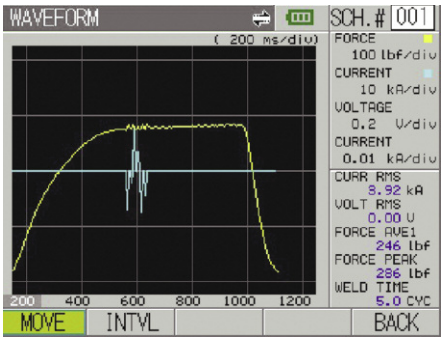
Waveform and data analysis
Precise graphical displays of waveform time and amplitude

Printer option
Instant screen prints and waveforms

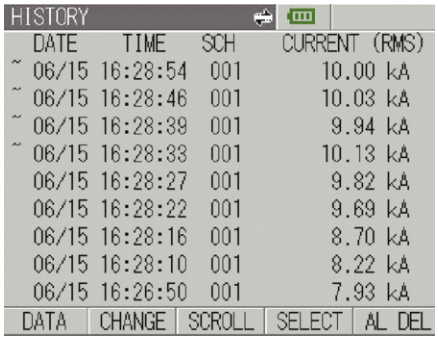
RS232 output
Color screen capture and data collection through COM port



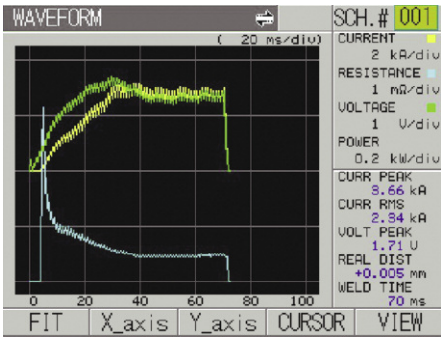
Drop-down menu navigation



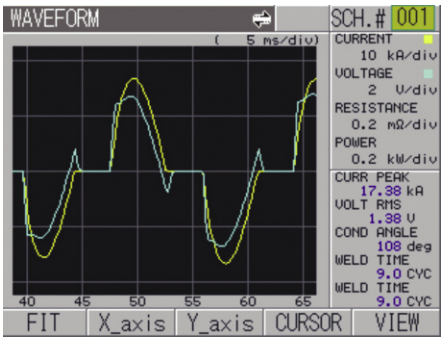
Force and current timing



Weld history



Current, voltage and resistance



Zoom of current and voltage

ACCESSORIES

Printer

Coils

TECHNICAL SPECIFICATIONS

Current Range	0.010 to 200.0 kA
Force range	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)
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 2000 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 6000 ms
Measurement mode for voltage and current	Arithmetic mean RMS or maximum, (peak)
Data output	RS-232 and optional external printer
Number of schedules	127
Power requirements, (AC adapter)	100 - 240 VAC, 50/60 Hz
Battery operation time	Approximately 2 hours with 1 battery, 4 hours with 2 batteries. 1 battery included.

WEIGHT & DIMENSIONS

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

MM-370
Next Generation Machine Mounted Weld Monitor

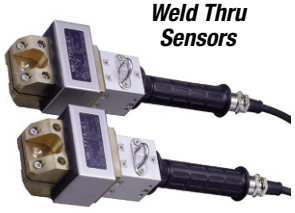
KEY FEATURES

- Measures current, voltage, force and displacement, resistance, weld time
- Set limits for all parameters
- 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 RS232/485 output

ACCESSORIES

Coils

Displacement Sensor



MA-770 and 771 Weld Thru Sensors

TECHNICAL SPECIFICATIONS

Current range	0.010 to 200.0 kA
Force range (MM-370A-00-01 only)	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)
Displacement range	GS-1813 A: 0 - 13 mm, 1 micron accuracy; GS-1830 A: 0 - 30 mm, 1 micron accuracy GS-510 0A: 0 - 100 mm, 10 micron accuracy
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 2000 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 6000 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, or standard RS-232/RS-485 port
Number of schedules	127
Power requirements	100 to 240 VAC, 50/60 Hz, 0.7 A

WEIGHT & DIMENSIONS

Dimensions (L x W x H)	11.4 in x 6.8 in x 10.6 in (290 mm x 172 mm x 269 mm) excluding protrusions
Weight	11 lb (5 kg)

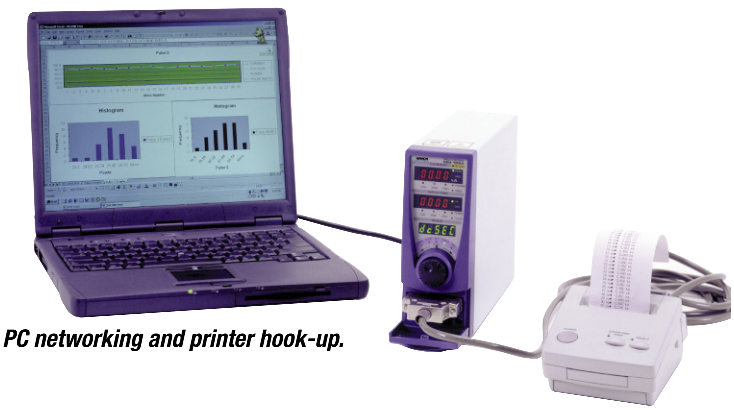
MM-122A

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.

```
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
PULSATION       :     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
PULSATION       :     0

SCHEDULE 03 ———————
CURRENT LOW     : 0.200 kA
CURRENT HIGH    : 0.300 kA
WELD TIME LOW   :    90 ms
WELD TIME HIGH  :   100 ms
```

Millisecond readings

```
SCHEDULE          :    01
CURRENT(RMS)●     : 0.687 kA
        (PEAK)    : 0.888 kA
WELD TIME         :    31 ms
COUNT             : 00117
WELD TIME   CURR(RMS)
——————————————————————
   1 ms●  0.663 kA
   2 ms●  0.710 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●  0.706 kA
  10 ms●  0.705 kA
  11 ms●  0.705 kA
  12 ms●  0.708 kA
  13 ms●  0.706 kA
  14 ms●  0.706 kA
  15 ms●  0.706 kA
  16 ms●  0.702 kA
  17 ms●  0.702 kA
  18 ms●  0.702 kA
  19 ms●  0.703 kA
  20 ms●  0.705 kA
  21 ms●  0.703 kA
  22 ms●  0.702 kA
```

Schedule info

```
COUNT  SCH CURR    TIME
             kA      ms
———————————————————————
00079  01  0.685R    21
00080  01  0.685R    21
00081  01  0.683R    21
00082  01  0.682R    21
00083  01  0.688R    21
00084  01  0.682R    21
00085  01  0.683R    21
00086  01  0.685R    21
00087  01  0.682R    21
00088  01  0.682R    21
00089  01  0.682R    21
00090  01  0.682R    21
00091  01  0.689R    21
00092  01  0.683R    21
00093  01  0.690R    21
00094  01  0.685R    21
00095  01  0.681R    21
00096  01  0.690R    21
00097  01  0.685R    21
00098  01  0.682R    21
00099  01  0.686R    21
00100  01  0.682R    21
00101  01  0.689R    21
00102  01  0.681R    21
00103  01  0.680R    21
00104  01  0.684R    21
00105  01  0.682R    21
```

Error only or all summary data

```
COUNT  SCH CURR    TIME
             kA      ms
———————————————————————
00119  01  H0.686R   31
00119  01  H0.686R   31
00119  01  H0.686R   31
00119  01  H0.687R   31
00119  01  H0.685R   31
00119  01  H0.686R   31
00119  01  H0.688R   31
00119  01  H0.686R   31
00119  01  H0.688R   31
00119  01  H0.686R   31
00119  01  H0.687R   31
00119  01  H0.688R   31
00119  01  H0.686R   31
00119  01  H0.686R   31
00119  01  H0.688R   31
00119  01  H0.689R   31
00119  01  H0.693R   31
00119  01  H0.693R   31
00119  01  H0.690R   31
00119  01  H0.692R   31
00119  01  H0.691R   31
00119  01  H0.694R   31
00119  01  H0.691R   31
00119  01  H0.698R   31
00119  01  H0.692R   31
```

Hi/low indication

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	0.010-0.199 kA (X10 coil), 0.100-1.999 kA, 1.00-19.99 A, 10.0-199.9 kA
Monitored value	RMS or PEAK
Time range	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
Conduction angle	30°–180°
Data output	RS-232 / 485 or optional printer

WEIGHT & DIMENSIONS

Dimensions (L x W x H)	9.7 in x 2.8 in x 7.5 in (246 mm x 70 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 L x W x H	1.18 in x 2.95 in x 6.7 in (30 mm x 75 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 (L x W x H)	1.18 in x 2.95 in x 6.7 in (30 mm x 75 mm x 170 mm)
Weight	1.1 lb (0.5 kg)

TOROIDAL COILS

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)

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
MA-520	Force sensor 1.10 to 22.04 lbf (0.50 to 10.00 kgf)	MM-601A, MA-770A-01, MA-771A-01
MA-521	Force sensor 11.0 to 220.4 lbf (5.0 to 100.0 kgf)	MM-601A, MA-770A-01, MA-771A-01
MA-522	Force sensor 110 to 2204 lbf (50 to 1000 kgf)	MM-601A, MA-770A-01, MA-771A-01

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-370A, MM-380A optional printer
18-042-01	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®

Applicable Models	MM-122A*, MM-370A, MM-380A
Part Number	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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