

# resistance welding Weld Checkers®

- Multi-Function Weld Monitors
- Weld Thru Current & Force
- Miniature & Handheld Weld Checkers
- Electronic Force Gauges
- Displacement Monitors
- PC Data Collection
- High Speed Printers
- Large Selection of Toroidal Coils



## Monitor & Checker Deliverables

- 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

## Why Monitor?

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

Miyachi Unitek'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.

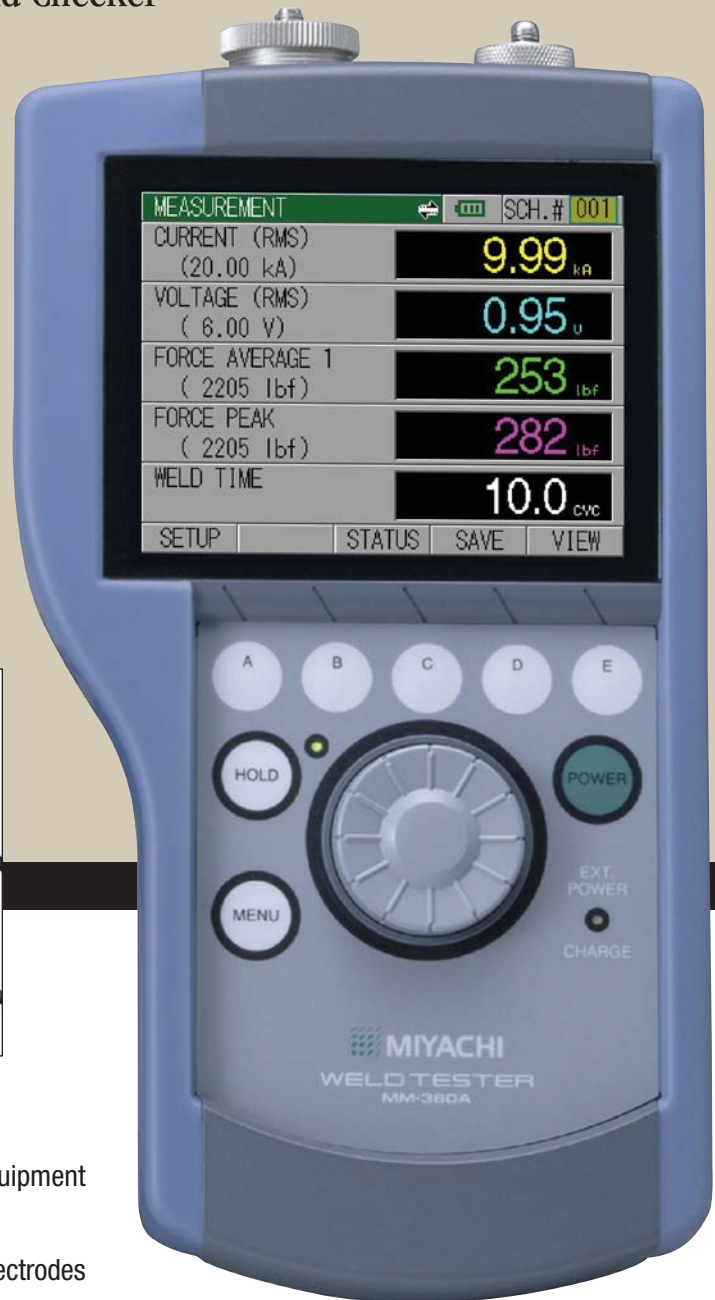


# Next Generation Hand-held Portable Weld Checker

## MM-380

### 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**

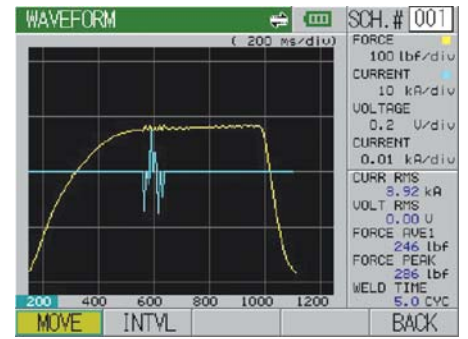
Instant screen prints and waveforms

### **RS232 output**

Color screen capture and data collection through COM port



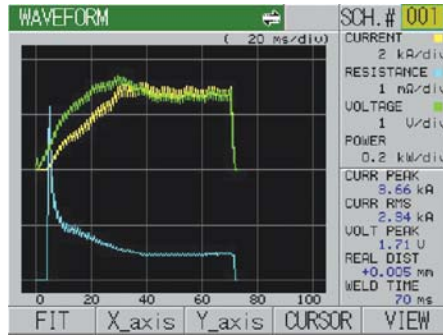
**Drop-down Menu Navigation**



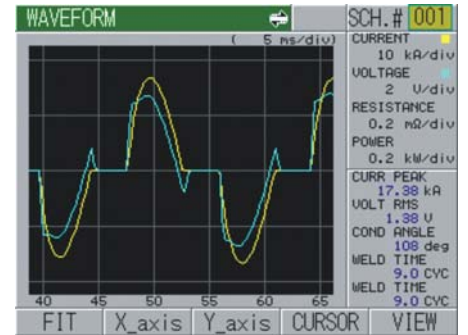
**Force and Current Timing**

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



**Printer**



**Coils**

## SPECIFICATIONS

<b>Current Range</b>	0.010 to 200.0kA
<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 Volts
<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 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>Dimensions Inches (mm) H x W x D</b>	9.9 x 5.5 x 2.2 (252 x 140 x 56) Excluding Protrusions
<b>Weight Lbs (kg)</b>	2 (0.9)
<b>Power Requirements, (AC Adapter)</b>	100 - 240 VAC, 50/60Hz
<b>Battery Operation Time</b>	Approximately 2 hours with 1 battery, 4 hours with 2 batteries. 1 battery included.

# Next Generation Machine Mounted Weld Monitor

## MM-370

### Key Features

- Measures current, voltage, force and displacement, resistance, weld time
- Set limits for all parameters
- Comprehensive machine I/O
- Easy screen-menu navigation
- Built-in printer and RS232/485 output



### ACCESSORIES



### SPECIFICATIONS

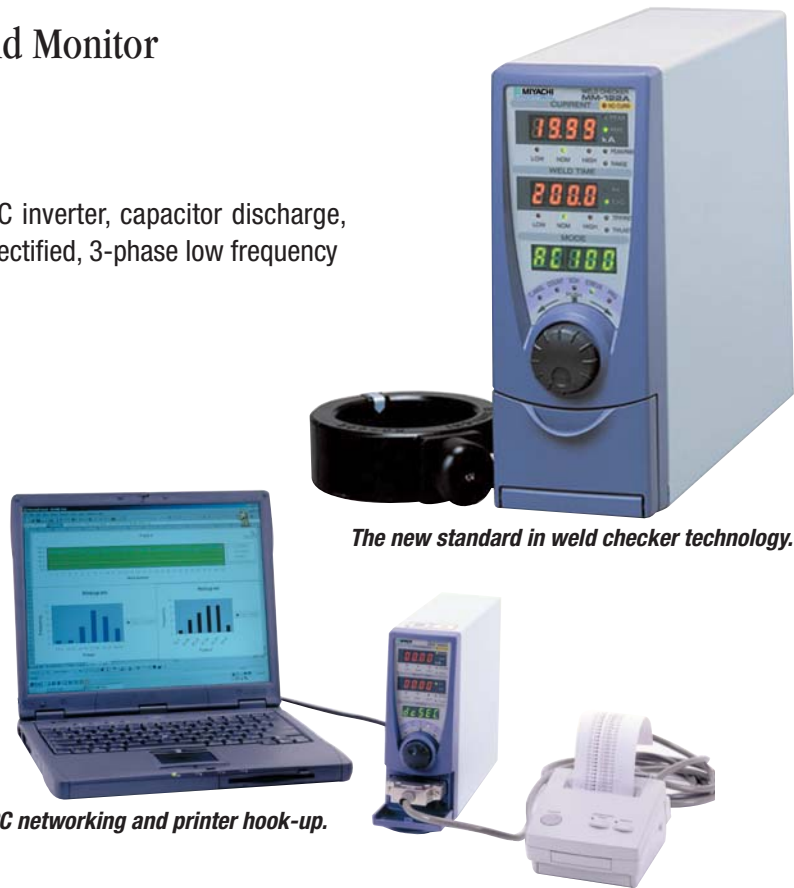
<b>Current Range</b>	0.010 to 200.0kA
<b>Force Range (MM-370A-00-01 Only)</b>	MA-770A-01: 55 to 1102 lbf, (25 to 500 kgf) MA-771A-01: 110 to 2204 lbf, (50 to 1000 kgf); MA-520: 1.10 to 22.04 lbf, (0.50 to 10.00 kgf) MA-521: 11.0 to 220.4 lbf, (5.0 to 100.0 kgf); MA-522: 110 to 2204 lbf, (50 to 1000 kgf)
<b>Displacement Range</b>	GS-1613A: 0 - 10mm, 1 micron accuracy; GS-1630A: 0 - 30mm, 1 micron accuracy GS-1000A: 0 - 100mm, 10 micron accuracy
<b>Voltage Range</b>	0.30 to 20.0 Volts
<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>	Data can be acquired using the built-in printer or standard RS-232/RS-485 port.
<b>Number of Schedules</b>	127
<b>Dimensions Inches (mm) H x W x D</b>	10.6 x 6.8 x 11.4 (269 x 172 x 290) Excluding Protrusions
<b>Weight Lbs (kg)</b>	11 (5)
<b>Power Requirements</b>	100 to 240 VAC, 50/60Hz, 0.7 Amps

# High Precision “Miniature” Weld Monitor

## MM-122A

### 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
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

Millisecond Readings

SCHEDULE	
CURRENT(RMS)	: 0.887 KA
(PEAK)	: 0.988 KA
WELD TIME	: 31 ms
COUNT	: 00117
WELD TIME CURR(RMS)	
1 ms	0.883 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	0.708 KA
10 ms	0.705 KA
11 ms	0.705 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	0.703 KA
20 ms	0.705 KA
21 ms	0.703 KA
22 ms	0.702 KA

Schedule Info

COUNT	SCH	CURR	TIME
		KA	ms
00078	01	0.887	21
00080	01	0.888	21
00081	01	0.883	21
00082	01	0.887	21
00083	01	0.888	21
00084	01	0.882	21
00085	01	0.883	21
00086	01	0.882	21
00087	01	0.882	21
00088	01	0.882	21
00089	01	0.888	21
00090	01	0.882	21
00091	01	0.888	21
00092	01	0.888	21
00093	01	0.890	21
00094	01	0.888	21
00095	01	0.881	21
00096	01	0.890	21
00097	01	0.888	21
00098	01	0.882	21
00099	01	0.888	21
01000	01	0.882	21
01001	01	0.889	21
01002	01	0.881	21
01003	01	0.888	21
01004	01	0.884	21
01005	01	0.882	21

Error Only or all Summary Data

COUNT	SCH	CURR	TIME
		KA	ms
00119	01	0.882	31
00119	01	0.882	31
00119	01	0.882	31
00119	01	0.882	31
00119	01	0.882	31
00119	01	0.882	31
00119	01	0.882	31
00119	01	0.882	31
00119	01	0.882	31
00119	01	0.882	31
00119	01	0.882	31
00119	01	0.882	31
00119	01	0.882	31
00119	01	0.882	31
00119	01	0.882	31
00119	01	0.882	31
00119	01	0.882	31
00119	01	0.882	31
00119	01	0.882	31
00119	01	0.882	31
00119	01	0.882	31

Hi/Low Indication

## 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>	0.010-0.199kA (X10 coil), 0.100-1.999kA, 1.00-19.99A, 10.0-199.9kA
<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
<b>Dimensions W x D x H Inches (mm)</b>	2.8 x 9.7 x 7.5 (70 x 246 x 190)
<b>Weight Lbs. (Kg)</b>	4.2 (1.9)

## Pocket Weld Testers

### MM-315B current/time

#### 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

#### 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°
<b>Dimensions W x D x H In (mm)</b>	2.95 x 1.18 x 6.7 (75 x 30 x 170 )
<b>Weight Lbs. (Kg)</b>	1.1 (0.5)



*The perfect pocket size troubleshooter.*

## 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

#### Specifications

<b>Power Supply</b>	Rechargeable battery and AC charger
<b>Force Sensor</b>	MA-520 max: 9.50 kg (20.9 lbs.) MA-521 max: 95.0 kg (209 lbs.) MA-522 max: 950 kg (2094 lbs.)
<b>Accuracy</b>	±3% full scale
<b>Measurement Speed</b>	Approx. 4 times per second
<b>Dimensions W x D x H In (mm)</b>	2.95 x 1.18 x 6.7 (75 x 30 x 170)
<b>Weight Lbs. (Kg)</b>	1.1 (0.5)

## Toroidal Coil Specifications



- For use with all current monitors.

<b>MB-400K</b>	400mm long 1.0 x sensitivity, 5 In. I.D.* (127mm)
<b>MB-800K</b>	800mm long 1.0 x sensitivity, 10 In. I.D. (254mm)
<b>MB-29F</b>	10 x sensitivity, 1 1/8" I.D. (29mm)
<b>MB-35E</b>	1.0 x sensitivity, 1 3/8" I.D. (35mm)
<b>MB-45F</b>	10 x sensitivity, 1 3/4" I.D. (45mm)
<b>MB-60E</b>	1.0 x sensitivity, 2 3/8" I.D. (60mm)
<b>MB-500-15</b>	500mm long 1.0 x sensitivity, 3" I.D. (76mm)

Extension cables for toroidal coils are optional.

\*Inner Diameter

## Force Sensors & Accessories

### Force and Current Sensors



Part Number	Description	Product
<b>MA-520</b>	Force sensor 0.20-9.50kg (0.44-20.9 lbs.)	MM-601A, MA-770A-01, MA-771A-01
<b>MA-521</b>	Force sensor 2.0-95.0kg (4.4-209 lbs.)	MM-601A, MA-770A-01, MA-771A-01
<b>MA-522</b>	Force sensor 20-950kg (44.1-2094 lbs.)	MM-601A, MA-770A-01, MA-771A-01

### Accessories

Part Number	Description	Product
<b>145-013</b>	Rechargeable battery, 1.2V 500MAH (4 required for checker)	MM-315B, MM-601A
<b>TP-50KM-A60</b>	Printer paper, 60mm x 25mm (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. Miyachi Unitek 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

## Monitor and Checker Selection Table

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	✓	✓	✓	✓	✓

## Ordering Information

Part Number	Description
<b>MM-122A</b>	Weld Checker AC/DC/CD current (RMS and PEAK), cycles/mS. counter, data output (RS-232/485), 31 measuring schedules. Current 0.100-1.999KA, 1.00-19.99KA, 10-199.9KA 1 x coil, sold separately
<b>MM-315B</b>	Weld Checker, pocket-size, AC/DC current, memory up to 9 impulses. Measure conduction angle, cycles, and RMS current. Dual range: 1-9.99 and 5-49.9 kA Includes MB-500-15 coil, battery charger, carrying case.
<b>MM-370A-00-00</b>	Weld Checker with current, voltage, power, resistance, time. Toroidal coil and voltage sense cable included.
<b>MM-370A-00-01</b>	Weld Checker with current, voltage, power, resistance, force, displacement, time. Toroidal coil and voltage sense cable included. Displacement sensor sold separately
<b>MM-370A-KIT 1</b>	Weld Checker with GS-1630A 30mm displacement sensor. Toroidal coil included.
<b>MM-380A-KIT 1</b>	Weld Checker with charger, voltage measuring cable and MB-800K toroidal coil. Case sold separately.
<b>MM-380A-KIT 2</b>	Weld Checker with charger, voltage measuring cable, MB-800K toroidal coil, printer, wheeled case.
<b>MM-380A-KIT 3</b>	Weld Checker with charger, voltage measuring cable, MB-800K toroidal coil, printer, wheeled case, 1100lb weld thru sensor.
<b>MM-380A-KIT 4</b>	Weld checker with charger, voltage measuring cable, MB-800K toroidal coil, printer, wheeled case, 2200lb weld thru sensor.
<b>MM-601A</b>	Weld pressure gauge, analog output, hold output. Includes: battery charger and carrying case. Force sensor sold separately. Requires MA-520, MA-521 or MA-522.

### Your Local Representative

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*Spirit Of Innovation.*

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