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# ADM IV™

## Arc Data Monitor

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### Operation / Installation Manual

Manual Part Number: A8M5012  
Revised: 26 June 2008





## SAFETY PRECAUTIONS – READ BEFORE USING

Welding is not particularly hazardous when certain safety practices are followed. Everyone using this equipment should be thoroughly trained in safe welding practices. Failure to observe safe practices may cause serious injury.

Handling welding torches presents no danger if the appropriate safety regulations are strictly adhered to. For example:

- Starting procedures must be reserved for those fully conversant with processes relating to arc welding equipment.
- Arc welding can prove damaging to eyes, skin, and hearing! It is therefore imperative that both management and operators understand and follow the ANSI Standard Z49.1, SAFETY IN WELDING AND CUTTING. All Personal Protective Equipment (PPE) shall be in place in accordance with this referenced specification and all other applicable and governing regulations.
- The operating data provided in the Specifications are maximum values. Overloading the welding torch will inevitably damage the product and void any and all warranties.
- Before changing any parts on the torch or control box, disconnect the torch from the welding power source and disconnect the control box input power source. Unplug the control box from the electrical outlet.
- The operating instructions for all other welding components - e.g. power source, wire feed and cooling unit must be followed per the manufacturer's recommendations.
- Never pull the cable assembly across sharp edges or set down on a hot surface.
- Never move the torch by pulling or dragging by the welding torch or cable.
- Curtains or partitions shall be installed to protect other workers or observers from arc radiation.
- When handling gas cylinders, consult the instructions issued by the manufacturers and the suppliers of the pressurized gas.
- Work pieces that have been degreased using chlorinated solvents must be sprayed down with clean water before welding starts to avoid the risk of phosgene forming. For the same reason, no degreasing baths containing chlorine must be placed close to the welding point.
- All vapors given off by metals can cause harm and a special warning is attached to lead, cadmium, copper, zinc, and beryllium. Take appropriate precautions to ensure that the legal maximum levels of toxic concentrations are not exceeded.
- Do not touch the welding torch with bare skin until it has had adequate time to cool down.
- Wait to adjust the rotation diameter until the torch has cooled to room temperature.

### Fume and Gases



**FUMES AND GASES can be hazardous. Welding and cutting produces fumes and gases. Breathing these fumes and gases can be hazardous to your health.**

- Keep your head out of the fumes. Do not breathe the fumes.
- If inside, ventilate the area and/or use local forced ventilation at the arc to remove welding and cutting fumes and gases. The recommended way to determine adequate ventilation is to sample for the composition and quantity of fumes and gases to which personnel are exposed.
- If ventilation is poor, wear an approved air-supplied respirator.
- Read and understand the Safety Data Sheets (SDSs) and the manufacturer's instructions for adhesives, coatings, cleaners, consumables, coolants, degreasers, fluxes and metals.
- Work in a confined space only if it is well ventilated, or while wearing an air-supplied respirator. Always have a trained watch-person nearby. Welding fumes and gases can displace air and lower the oxygen level causing injury or death. Be sure the breathing air is safe.
- Do not weld or cut in locations near degreasing, cleaning, or spraying operations. The heat and rays of the arc can react with vapors to form highly toxic and irritating gases.

- Do not weld or cut on coated metals, such as galvanized, lead, or cadmium plated steel, unless the coating is removed from the weld area, the area is well ventilated, and while wearing an air supplied respirator. The coatings and any metals containing these elements can give off toxic fumes if welded.

### Arc Rays



**ARC RAYS can burn eyes and skin. Arc rays from welding and cutting processes produce intense visible and invisible (ultraviolet and infrared) rays that can burn eyes and skin. Sparks fly off from the weld.**

- Wear an approved welding helmet fitted with a proper shade of filter lenses to protect your face and eyes from arc rays and sparks when welding, cutting, or watching (see ANSIZ49.1 and Z87.1 listed in Safety Standards).
- Wear approved safety glasses with side shields under your helmet.
- Use protective screens or barriers to protect others from flash, glare and sparks; warn others not to watch the arc.
- Wear body protection made from durable, flame resistant material (leather, heavy cotton, wool).
- Body protection includes oil-free clothing such as leather gloves, heavy shirt, cuff less trousers, high shoes and a cap.

### Welding and Cutting



**Welding or cutting on closed containers such as tanks, drums or pipes, can cause them to blow up. Sparks can fly off from the welding or cutting arc. The flying sparks, hot work piece and hot equipment can cause fires and burns. Accidental contact of electrode to metal objects can cause sparks, explosion, overheating or fire. Check and be sure the area is safe before doing any welding or cutting.**

- Remove all flammables within 35 ft. (10.7 m) of the welding or cutting arc. If this is not possible, tightly cover them with approved covers.
- Do not weld or cut where flying sparks can strike flammable material.
- Protect yourself and others from flying sparks and hot metal.
- Be aware that welding sparks and hot materials from welding and cutting can easily go through small cracks and openings to adjacent areas.
- Watch for fire, and keep a fire extinguisher nearby.
- Be aware that welding or cutting on a ceiling, floor, bulkhead or partition can cause fire on the hidden side.
- Do not weld or cut on containers that have held combustibles, or on closed containers such as tanks, drums, or pipes unless they are properly prepared according to AWS F4.1 and AWS A6.0 (see Safety Standards).
- Do not weld or cut where the atmosphere may contain flammable dust, gas, or liquid vapors (such as gasoline).
- Connect work cable to the work as close to the welding or cutting area as practical to prevent welding or cutting current from traveling long, possibly unknown paths and causing electric shock, sparks and fire hazards.
- Do not use welder to thaw frozen pipes.
- Remove stick electrode from holder or cut off welding wire at contact tip when not in use.
- Remove any combustibles, such as a butane lighter or match, from your person before doing any welding or cutting.
- After completion of work, inspect area to ensure it is free of sparks, glowing embers, and flames.
- Use only correct fuses or circuit breakers. Do not oversize or by-pass them.

- Follow requirements in OSHA 1910.252 (a) (2) (iv) and NFPA 51B for hot work and have a fire watcher and extinguisher nearby.
- Read and understand the Safety Data Sheets (SDSs) and the manufacturer's instructions for adhesives, coatings, cleaners, consumables, coolants, degreasers, fluxes and metals.

### Electric Shock



**Touching live electrical parts can cause fatal shocks or severe burns. The electrode and work circuit is electrically live whenever the output is on. The input power circuit and machine internal circuits are also live when power is on. In gas metal arc welding (GMAW), the wire, wire reel, drive roll housing and all metal parts touching the welding wire are electrically live. Incorrectly installed or improperly grounded equipment is a hazard.**

- Do not use AC output in damp areas, if movement is confined, or if there is danger of falling.
- Use AC output ONLY if required for the welding or cutting process.
- If AC output is required; use remote output control if present on unit. Additional safety precautions are required when any of the following electrically hazardous conditions are present: in damp locations or while wearing wet clothing; on metal structures such as floors, gratings or scaffolds; when in cramped positions such as sitting, kneeling or lying; or when there is a high risk of unavoidable or accidental contact with the workpiece or ground. For these conditions, use the following equipment in order presented: 1) a GMAW DC constant voltage (wire) welder, 2) a DC manual (stick) welder or 3) an AC welder with reduced open circuit voltage. In most situations, use of a DC, constant voltage wire welder is recommended. And, do not work alone!
- Disconnect input power or stop engine before installing or servicing equipment. Lockout/tagout input power according to OSHA 29 CFR 1910.147 (see Safety Standards).
- Properly install, ground, and operate this equipment according to its Owner's Manual and national, state/provincial and local codes.
- Always verify the supply ground – check and be sure that input power cord ground wire is properly connected to ground terminal in disconnect box or that cord plug is connected to a properly grounded receptacle outlet.
- When making input connections attach proper grounding conductor first and double-check connections.
- Keep cords dry, free of oil and greases and protected from hot metal and sparks.
- Frequently inspect power cord for damage or bare wiring. Replace cord immediately if damaged. Bare wiring can kill.
- Turn off all equipment when not in use.
- Do not use worn, damaged, undersized or poorly spliced cables.
- Do not drape cables over your body.
- If earth grounding of the workpiece is required; ground it directly with a separate cable.
- Do not touch electrode if you are in contact with the work, ground or another electrode from a different machine.
- Do not touch electrode holders connected to two welding machines at the same time since double open circuit voltage will be present.
- Use only well-maintained equipment. Repair or replace damaged parts at once. Maintain unit according to manual.
- Wear a safety harness if working above floor level.
- Keep all panels and covers securely in place.
- Clamp work cable with good metal-to-metal contact to workpiece or worktable as near the weld as practical.
- Insulate work clamp when not connected to workpiece to prevent contact with any metal object.
- Do not connect more than one electrode or work cable to any single weld output terminal. Disconnect cable for process when not in use.

## Cylinders

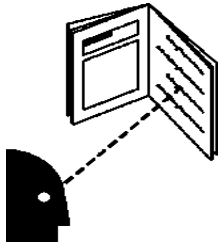


**Compressed gas cylinders contain gas under high pressure. If damaged, a cylinder can explode. Since gas cylinders are normally part of the welding process, be sure to treat them carefully.**

- Protect compressed gas cylinders from excessive heat, mechanical shocks, physical damage, slag, open flames, sparks and arcs.
- Install cylinders in an upright position by securing to a stationary support or cylinder rack to prevent falling or tipping.
- Keep cylinders away from any welding, cutting or other electrical circuits.
- Never drape a welding electrode or cutting torch over a gas cylinder.
- Never allow a welding electrode or cutting torch to touch any cylinder.
- Never weld on a pressurized cylinder – explosion will result.
- Use only the correct compressed gas cylinders, regulators, hoses and fittings designed for the specific application; maintain them and associated parts in good condition.
- Turn face away from valve outlet when opening cylinder valve. Do not stand in front of or behind the regulator when opening the valve.
- Keep protective cap in place over valve except when cylinder is in use or connected for use.
- Use the right equipment, correct procedures and sufficient number of persons to lift and move cylinders.
- Read and follow instructions on compressed gas cylinders, associated equipment, and Compressed Gas Association (CGA) publication P-1 listed in Safety Standards.

## Additional Safety Warnings for Installation, Operation and Maintenance

### READ INSTRUCTIONS



- Read and follow all labels and the Owner's Manual carefully before installing, operating, or servicing the unit.
- Read the safety information at the beginning of the manual and each section.
- Use only genuine replacement parts from the manufacturer.
- Perform maintenance and service according to the Owner's Manual, industry standards and national, state/provincial and local codes.

### ELECTRIC AND MAGNETIC FIELDS (EMF) can affect implanted Medical Devices



- Wearers of Pacemakers and other Implanted Medical Devices should keep away.
- Implanted Medical Device wearers should consult their doctor and the device manufacturer before going near arc welding, spot welding, gouging, plasma arc cutting or induction.

### H.F. RADIATION can cause interference



- High-frequency (H.F.) can interfere with radio navigation, safety services, computers and communications equipment.
  - Have only qualified persons familiar with electronic equipment perform this installation. The user is responsible for having a qualified electrician promptly correct any interference problem resulting from the installation.
  - Have the installation regularly checked and maintained.
  - If notified by the FCC about interference, stop using the equipment at once.
- Keep high-frequency source doors and panels tightly shut, keep spark gaps at correct setting and use grounding and shielding to minimize the possibility of interference.

### California Proposition 65 Warnings

Welding or cutting equipment produces fumes or gases that contain chemicals known to the State of California to cause birth defects and in some cases, cancer. (California Health & Safety Code Section 25249.5 et seq.) This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm. Wash your hands after using.

### EMF Information

Electric current flowing through any conductor causes localized electric and magnetic fields (EMF). The current from arc welding (and allied processes including spot welding, gouging, plasma arc cutting, and induction heating operations) creates an EMF field around the welding circuit. EMF fields may interfere with some medical implants, e.g. Pacemakers. Protective measures for persons wearing medical implants have to be taken. For example, restrict access for passersby or conduct individual risk assessment for welders. All welders should use the following procedures in order to minimize exposure to EMF fields from the welding circuit:

1. Keep cables close together by twisting or taping them, or using a cable cover.
2. Do not place your body between welding cables. Arrange cables to one side and away from the operator.
3. Do not coil or drape cables around your body.
4. Keep head and trunk as far away from the equipment in the welding circuit as possible.
5. Connect work clamp to workpiece as close to the weld as possible.
6. Do not work next to, sit or lean on the welding power source.
7. Do not weld while carrying the welding power source wire feeder.

#### About Implanted Medical Devices:

Implanted Medical Device wearers should consult their doctor and the device manufacturer before performing or going near arc welding, spot welding, gouging, plasma arc cutting, or induction heating operations. If cleared by your doctor, then following the above procedures is recommended.

#### Safety Standards

- ANSI Standard Z49.1, SAFETY IN WELDING AND CUTTING, American Welding Society, 2501 N.W. 7<sup>th</sup> St., Miami, FL 33125. Free download at [http://www.aws.org/technical/AWS\\_Z49.pdf](http://www.aws.org/technical/AWS_Z49.pdf)
- ANSI Standard Z41.1, STANDARD FOR MEN'S SAFETY - TOE FOOTWEAR obtainable from the American National Standards Institute, 1430 Broadway, New York, NY 10018.
- ANSI Standard Z49.2, FIRE PREVENTION IN THE USE OF CUTTING AND WELDING PROCESSES obtainable from the American National Standards Institute, 1430 Broadway, New York, NY 10018.
- OSHA, SAFETY AND HEALTH STANDARDS, 29CFR 1910, obtainable from the U.S. Government Printing Office, Washington, D.C. 20402.
- OSHA, PERSONAL PROTECTIVE EQUIPMENT, OSH 3151-12R 2003. Free download at <https://www.osha.gov/Publications/osha3151.pdf>



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## 1.0 GENERAL DESCRIPTION

### 1.1 SYSTEM DESCRIPTION

The ADM IV™ Arc Data Monitor is a user friendly, self-diagnostic microprocessor system designed to provide quality control for critical welding operations. It can be employed as a stand-alone unit using the “Remote Control Pendant” to configure the system and view the results or it can be linked to a PC to accomplish the same tasks. The features and benefits of the ADM IV™ are:

#### **FEATURES:**

*Personal computer interface*

*Networking capability*

*64 user definable weld schedules (expandable to 128)*

*Plug-in sensors and remote pendant*

*Monitoring / logging of all welding process data (including pulse parameters)*

*Compact, versatile, rugged and lightweight design*

*Two spare analog inputs*

#### **BENEFITS:**

*Facilitates off-line programming and data collection*

*Network multiple ADMs to a single computer (up to 250)*

*Simplified installation and upgrade capability*

*Provides documentation and data trend analysis relating to the welding process on a non-invasive basis*

*Easily installed in new or existing applications*

*Provides versatility / flexibility for additional parameter inputs*

#### **OVERVIEW:**

The Arc Data Monitor is a self-diagnostic microprocessor system designed to provide quality control for arc welding applications. With the appropriate welding sensors or transducers installed, the ADM IV™ can monitor a welding system for the following parameters (units of measure are shown in parentheses):

*Gas flow rate (cubic feet/hour or liter/minute)*

*Elapsed weld time (seconds)*

Wire feed speed (inches/minute or millimeters/second)

Arc current (amps)

Arc voltage (volts)

Travel speed (inches/minute or millimeters/second)

Heat (K joules/inch or K joules/millimeter)

Temperature (range depends on sensor used)

When welding in the pulse mode, the ADM IV™ can also monitor welding conditions based on these parameters:

Peak pulse current (amps)

Peak pulse voltage (volts)

Background pulse current (amps)

Background pulse voltage (volts)

Pulse Frequency (Hertz)

**NOTE:** Pulse welding parameters are not limit tested.

PARAMETER	RANGE	ACCURACY	RESOLUTION
Weld Time	0.1-6566.7 sec	±0.1 sec	0.1 sec
Arc Voltage	0 – 100.0 vdc	±1% of full scale	0.1 vdc
Arc Current	0 – 1000 adc	±1% of full scale	1 adc
Wire Feed Speed	10 – 1000 ipm (4.2 – 423 mm/s)	±3% of full scale	1 ipm (0.4 mm/s)
Travel Speed	1 – 100 ipm (0.4 – 42 mm/s)	±3% of full scale	0.1 ipm (0.04 mm/s)
Gas Flow	5 – 255 scfh (2 – 120 lpm)	±2% full scale ±1 Digit	±1 scfh (±1 lpm)
Temperature	Depends on sensor	Depends on sensor	Depends on sensor

## 1.2 SPECIFICATIONS

Dimensions	3.0"H X 8.5"W X 11"L (76mm X 165mm X 280mm)
Weight	9.5 lbs (4.3kg)
Power Requirements	115 VAC or 220 VAC 50/60 Hz @ 1 amp
Communications	RS-232-C serial port, RS-485 network port, RS-485 pendant port, Centronics parallel printer interface
System Interface	8 – 24 VDC inputs, 8 user definable relays (120 VAC @ 1A)
Display	4 line, 40 character, alpha-numeric

## 2.0 INSTALLATION

This chapter contains the following information on the installation of the ADM IV™ system:

*Power-up testing*

*Installation of system transducers and sensors*

*Printer installation*

*Remote pendant installation*

*Remote I/O installation*

### 2.1 POWER-UP TESTING PROCEDURE

Begin the installation of the ADM IV™ system by performing this testing procedure.

1. Carefully unpack the unit and associated transducers, sensors, and cables. Inspect the items for possible shipping damage and report any damage to the carrier.
2. Locate the power cable assembly and insert the cable connector into the receptacle on the bottom panel of the unit. Plug the power cable into a suitable power source.

**NOTE:** *The ADM IV™ unit has AUTO VOLTAGE SWITCHING and is capable of operating from either 115 VAC or 220 VAC 50/60 HZ.*

3. Apply AC power to the unit.
4. Power up the unit by pressing the power switch on the bottom panel. The unit responds as follows:

During power up, the ADM IV™ displays the software model and version number for about two seconds while performing internal testing of the unit. The following message is displayed:

Computer Weld Technology, Inc. ADM IV Remote Pendant A5I0022 Ver #.## - Revised XX/XX/XX Copyright (C) 1999 All rights reserved.
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Where: #.## = The current software version and XX/XX/XX = last revision date.

Once the internal diagnostic tests have been performed and successfully completed, the following message is displayed:

ADM IV Advance Weld Monitor Ready!		
Date: mm/dd/yr	Time: hh/xx/ss	
Sched:	Faults:	Station:
ALTER	NEXT	

Where: mm = current month; dd = current day; yr = current year; hh = current hour; xx = current minutes; ss = current seconds.

When the unit passes the power-up testing, turn off the power and proceed with the installation of the sensors.

## 2.2 SENSOR INSTALLATION

All sensors connect to the bottom panel of the ADM IV™ through PT series connectors. **Caution** should be exercised in connecting the sensors to the ADM IV™. Make sure the cable marked for the appropriate sensor is installed into the correct sensor port on the ADM IV™.

When installing the **DART** sensor with the ADM IV™ refer to paragraph 2.12 and Appendix D.

## 2.3 CURRENT SENSOR INSTALLATION

The Current Sensor assembly consists of a Hall-Effect clamp-on device and a cable assembly for connection to the unit. **The Current Sensor must be installed around the work piece ground lead from the power supply. The two “RED DOTS” on the sensor must be oriented toward the most positive potential.** The location of the sensor is not critical and the welding cables may be as long as required for the application.

### 2.3.1 CURRENT SENSOR CABLE INSTALLATION

The Current Sensor is supplied with a 25-foot cable. To connect the sensor cable to the unit, locate the port labeled “**CURRENT**” on the bottom of the unit chassis. Plug the cable labeled “**CURRENT**” into the “**CURRENT**” port connector.

## 2.4 VOLTAGE SENSOR INSTALLATION

The Voltage Sensor assembly consists of a probe device and a cable assembly for connection to the unit. The in-line arc voltage probe has two permanently attached leads, one RED and one BLACK, to facilitate the connection of the sensor to the welding system. Connect the RED / BLACK leads as close to the welding torch as possible in order to assure proper measurement. Connect the leads to the appropriate location indicated in the table below. If the connections provided on the leads are not suitable, any appropriate connector can be used. If the lead lengths are not the

required lengths, they may be shortened or lengthened using the appropriate wire type.

APPLICATION	RED (+) LEAD	BLACK (-) Lead
GMAW	Electrode	Work
P-GMAW	Electrode	Work
GTAW	Work	Electrode
P-GTAW	Work	Electrode
SMAW (Reverse Polarity)	Electrode	Work
SMAW (Straight Polarity)	Work	Electrode
FCAW	Electrode	Work
PAW	Work	Electrode
P-PAW	Work	Electrode
SAW	Electrode	Work

#### 2.4.1 VOLTAGE SENSOR CABLE INSTALLATION

The Voltage Sensor is supplied with a 25-foot cable. To connect the sensor cable to the unit, locate the port labeled “**VOLTAGE**” on the bottom of the unit chassis. Plug the cable labeled “**VOLTAGE**” into the “**VOLTAGE**” port connector.

#### 2.5 GAS FLOW INSTALLATION

The Gas Flow option consists of a transducer assembly and a sensor cable. The unit is designed to measure gas flow with a maximum inlet pressure of 50 psi. The transducer should be installed with supplied fittings in the welding shielding gas lines, on the **outlet side of the gas control solenoid valve**. The unit should be located as close to the welding torch as practical.

**NOTE:** To avoid damage to the transducer assembly, do not use any type of pipe dope when making the connection.

The transducer should be placed as far as possible from any source of high frequency interference, such as a GTAW welding power supply.

##### 2.5.1 GAS FLOW CABLE INSTALLATION

The gas flow transducer is supplied with a 25-foot cable. To connect the sensor cable to the unit, locate the port labeled “**GAS**” on the bottom of the unit chassis. Plug the cable labeled “**GAS**” into the “**GAS**” port connector.

#### 2.6 WIRE SPEED TRANSDUCER INSTALLATION

The Wire Feed Speed transducer consists of an optical tachometer with a precision drive wheel and a control cable. This device is designed to clamp directly on the welding wire and can be installed without the removal of the welding wire from the wire feeder during installation.

Permanently installing the wire feed speed transducer on the wire feeder is the preferred method of installation as it ensures a stable mounting of the assembly. The transducer is electrically isolated from the welding electrode so the transducer can be mounted to any part of the wire feeder. The housing of the transducer has four 8-32 tapped holes for mounting purposes, two on the bottom and one on each side.

**NOTE:** *Make sure when permanently mounting the transducer on the wire feeder that the inlet and outlet of the transducer are in line with the wire guides of the wire feeder.*

The wire speed transducer can also be installed by simply clamping it over the welding wire at the point where the wire enters the wire feeder. To install the wire speed transducers using this method, simply depress the handle on the top of the transducer, slip the assembly over the wire, and release the handle.

### 2.6.1 WIRE SPEED TRANSDUCER CABLE INSTALLATION

The Wire Feed Speed transducer is supplied with a 25-foot cable. To connect the sensor cable to the unit, locate the port labeled “**WIRE**” on the bottom of the unit chassis. Plug the cable labeled “**WIRE**” into the “**WIRE**” port connector.

### 2.7 TRAVEL SPEED TRANSDUCER INSTALLATION

The Travel Speed Transducer assembly consists of a tachometer that measures the travel speed of the welding torch and a control cable. The transducer is a surface contact device supplied with a spring-loaded hinge to ensure proper surface tension. The hinge provides for a +20 to -10 degree movement of the transducer with respect to the drive carriage of the torch. In order to ensure accurate measurement, the transducer must be rigidly mounted on the drive carriage with the drive wheel perpendicular to the drive surface.

The spring-loaded hinge has two tapped 10-32 holes on the upper bracket for mounting purposes and may be located on either side or on top of the transducer housing. To move the hinge to the other side of the transducer housing, follow these steps:

- 1) Remove the hinge bolt and slowly release the tension on the two springs.

**CAUTION:** *Before removing the hinge bolt, make sure the top bracket of the hinge is secured in order to prevent the uncontrolled release of the spring tension.*

- 2) Loosen the mounting screws and move the lower hinge bracket to the desired location on the transducer housing.
- 3) Secure the bracket to the housing. Using a small piece of ¼-inch tubing to compress the spring, position the spring in the lower bracket and reassemble the hinge.
- 4) Remove the tubing from the end of the spring once the hinge bolt and lock nut is installed.

**Note:** *When using A3A0263 Travel speed sensor the M37 mode must be set to a 1 to enable the correct sensor scaling. (M37=1).*



### 2.7.1 TRAVEL SPEED TRANSDUCER CABLE INSTALLATION

The Travel Speed Transducer is supplied with a 25-foot cable. To connect the sensor cable to the unit locate the port labeled “**TRAVEL**” on the bottom of the unit chassis. Plug the cable labeled “**TRAVEL**” into the “**TRAVEL**” port connector.

### 2.8 TEMPERATURE SENSOR INSTALLATION

The Temperature Sensor assemblies, of which there are two, consist of the following options:

#### 2.8.1 INFRARED SENSOR

An electronic module that processes information gathered by the sensor and provides appropriate input to the ADM IV™ for temperature measurement. Refer to manufacturer’s manual for installation of this device.

#### 2.8.2 THERMOCOUPLE SENSOR

Consists of an enclosure housing the necessary electronics to convert collected data to a useable signal for input to the ADM IV™ and a sensor cable. The user supplies the appropriate contact sensor probe (Type “K”, Type “J”, or Type “T”) depending on desired temperature range. The selected “Type” of contact sensor probe must be attached to the point on the work piece from which temperature data is desired.

#### 2.8.3 TEMPERATURE SENSOR CABLE INSTALLATION

To connect the Temperature Sensor to the ADM IV™ with the supplied 25-foot cable, the following is required:

***INFRARED SENSOR*** - Connections on the sensor end of the cable are made to the numbered terminal strip on the electronics module. To connect the sensor cable to the unit locate the port “**TEMP**” on the bottom of the unit chassis. Plug the cable labeled “**TEMP**” into the “**TEMP**” port connector.

***THERMOCOUPLE SENSOR*** - The sensor is supplied with a 25-foot cable. To connect the sensor cable to the unit, locate the port connector labeled “**TEMP**” on the bottom of the unit chassis. Plug the cable labeled “**TEMP**” into the “**TEMP**” port connector.

### 2.9 PRINTER INSTALLATION

The ADM IV™ system is designed for use with any printer that communicates via a Centronics parallel interface. To connect a printer to the system, a printer interface cable is available or an IBM parallel printer cable may be used. This cable uses an Amphenol PN 57-30360 or equivalent 36-circuit connector and an Amphenol PN 117D-DB25S with an Amphenol PN 17-1589-06 two-piece hood. To install an external printer to the system, follow these steps:

*Connect the 25-pin connector end of the interface cable to the connector labeled “**PRINTER**” on the lower left side of the unit chassis.*

*Connect the other end of the cable to the Centronics connector on the printer, referring to the printer manual for the location of the connector if necessary.*

*Connect the printer to a 115 VAC power source.*

*To Print Pulse Data an 80 column printer is needed.*

**NOTE:** *It may be necessary to consult the printer documentation for any special instructions concerning the Centronics interface. For example, not all printers of this type use the full Centronics handshake or fault signals.*

## 2.10 REMOTE PENDANT INSTALLATION

The ADM IV™ can be installed with a remote pendant that allows operation of the unit from a standard distance of up to 25 feet. (If additional distance is required, please consult the factory.) To connect the remote pendant to the ADM IV™, locate the port on the bottom of the unit marked “**REMOTE DISPLAY**”. Plug the cable end marked “**REMOTE DISPLAY**” to the “**REMOTE DISPLAY**” port connector. Plug the other end of the cable into the Pendant connector.

## 2.11 REMOTE I/O INSTALLATION

The Remote I/O cable provides a means of interfacing the ADM IV™ fault relays, remote reset, and remote weld schedule input to external control systems. The standard cable length is 25 feet. To connect the cable to the ADM IV™, locate the port on the bottom of the unit marked “**REMOTE I/O**”. Plug the cable end marked “**REMOTE I/O**” to the “**REMOTE I/O**” port connector. Plug the other end of cable into your PLC or robotic controller. See Appendix C for examples that can be used as a guideline to interface the ADM to PLC or robotic controller.

## 2.12 DART SENSOR INSTALLATION

The DART sensor is a single, compact, lightweight, easy to install unit that provides the voltage, current, wire feed speed and gas pressure measurements to the ADM IV™. When used with the ADM IV™ it replaces the need for individual Voltage, Current, Wire Feed Speed and Gas Pressure sensors. Refer to Appendix D for installation procedures for the DART sensor.

**NOTE:** *When the DART sensor is used with the ADM IV™ the GAS PRESSURE reading is displayed in the AUX 1 window. The Pressure is displayed in 0.1 PSI increments*

## 3.0 OPERATION

The monitoring mode is the normal operational mode for the ADM IV™ unit. This operational mode in fact consists of three distinct functional states:

*Idling*

*Alter Limits*

*Monitoring*

Because the state of the unit determines the contents of displays as well as the functions of individual keys on the front control panel, this chapter discusses each possible state separately.

### 3.1 THE IDLE / ALTERING STATE

Once the ADM IV™ has been installed and ready for use, the operator may apply power to the unit by pressing the power switch on the bottom panel. The unit responds as follows:

During power up the ADM IV™ displays the software model and version number for about two seconds while performing internal testing of the unit. The following message is displayed:

```
Computer Weld Technology, Inc.  
ADM IV Remote Pendant  
A5I0022 Ver #.## - Revised XX/XX/XX  
Copyright (C) 1999 All rights reserved.
```


Where: #.## = the current software version; XX/XX/XX = last revision date.

Once the internal diagnostic tests have been performed and successfully completed, the following **IDLE SCREEN** message is displayed:

```
ADM IV Advance Weld Monitor Ready!  
Date: mm/dd/yr           Time: hh/xx/ss  
Sched:#           Faults:#           Station:###  
ALTER           NEXT
```

Where: mm = current month; dd = current day; yr = current year; hh = current hour; xx = current minutes; ss = current seconds.

As long as no welding arc has been detected, the unit maintains an idle state. While in the **IDLE SCREEN** mode the ADM IV™ will display the current date and time as programmed, the current schedule number, the number of faults counted (up to 100 total before auto reset) and the station number as programmed.

From the idle screen the operator may scroll between the following screens by pressing the arrow button  directly under the “NEXT” command on the display screen.

*Idle Screen*

*Weld Data Screen*

*AUX Data Screen (only if the AUX 1 or 2 sensors are enabled)*


*Pulse Weld Screen (only if Pulse Weld is enabled)*

*Weld Summary Screen*


*Faulted Data Screen*

From the **IDLE SCREEN** press the  “NEXT” key to display the **WELD DATA SCREEN**.

TIME= .#	VOLTS=.#	AMPS= #
WIRE= #	TRAVEL= .#	HEAT= .#
GAS= #	TEMP= #	SCHED= #
ALTER	<b>NEXT</b>	

Press the  “NEXT” key to display the **AUX DATA SCREEN** that only appears if one of the AUX inputs is enabled. *(When the **DART Sensor** is used with the ADM IV the AUX 1 Limit must be enabled. The Gas Pressure value will be displayed in the AUX 1 value of this screen in 0.1-PSI increments)*

TIME= .#	VOLTS=.#	AMPS= #
WIRE= #	TRAVEL= .#	HEAT= .#
GAS= #	AUX1= #	AUX2= #
ALTER	<b>NEXT</b>	

Press the  “NEXT” key to display the **PULSE WELD DATA SCREEN** that only appears if PULSE WELD is enabled.


ARC TIME= .#		PULSE FREQ= .#
VOLT= .#	PKVOLT= .#	BKVOLT= .#
AMP= #	PKAMP= #	BKAMP= #
ALTER	<b>NEXT</b>	

Press the  “NEXT” key to display the **WELD SUMMARY SCREEN**.

Weld Summary:	TIME= .#	GAS= #
VOLTS= #	AMPS= #	WIRE= #
TRAVEL= .#	HEAT= .#	TEMP= #
ALTER	<b>NEXT</b>	

Press the  “**NEXT**” key to display the **FAULTED DATA SCREEN**.

Faulted Data:	TIME= .#	GAS= #	
VOLTS=.#	AMPS= #	WIRE= #	
TRAVEL= .#	HEAT= .#	TEMP= #	
REVIEW	<b>NEXT</b>	HELP	RESET

Press the  “**NEXT**” key to display the IDLE SCREEN on the ADM IV™.

### 3.2 SETTING THE ADM IV PASSWORD

The Password function is designed to limit access to the ADM IV Alter Limits Screens and the Configuration Screens. The factory default password is 0. To change the password, using the ADMSTAT Plus Terminal program, connect the ADM IV to the P.C. with the RS-232 cable. From the Terminal Mode type the following command: V47=# <enter> (where # = your password). Once the password is entered from the terminal program it must be used to Alter the Limits or change the Configuration of the ADM IV from the pendant display. To enter the password using the pendant, press the ALTER key. Press the Increase or Decrease button until the password number matches the password. Press the enter key and the LIMITS and CONFIG screen will appear.

### 3.3 ALTER LIMITS CONTROLS

**Note: Do not try to ALTER ADM IV Parameters or Configuration while the ADM IV is collecting and testing weld data (When the ARC is Active). Doing so will cause corrupted data in the ADM IV.**

Each screen has parameters and limits that the user can adjust or monitor. To Alter Limits or change the ADM IV Configuration from the ADM IV Pendant, press the **ALTER** key displayed on the Idle Screen, Weld Data Screen, AUX Data Screen (only if the AUX 1 or 2 sensors are enabled), Pulse Weld Screen (only if Pulse Weld is enabled) or Weld Summary Screen. The Following Screen will appear:


Select ADM Parameters to Edit:		
LIMITS	CONFIG	EXIT

### 3.3.1 ACCESSING LIMITS CONTROLS


From the above Screen the operator can select the edit **LIMITS** function. This function provides the operator the ability to:

- Adjust the weld monitoring limits
- Enable or disable sensors being used by the ADM IV™

**NOTE:** All sensors are enabled and disabled in the same manner as shown in this example.

Press the  under the **LIMITS** command on any of the command screens. The **WELD TIME LIMITS SCREEN** should appear.

Weld Time Limits:	Sensor Enabled=	<b>YES</b>
Max=#.#	Delay=.	##
Min=#.#	Fault Time=.	##
NEXT	<b>EDIT</b>	EXIT

To make changes to any LIMIT Screen, press the  under the **EDIT** command and a cursor will appear in the **Sensor Enabled** field. The screen will change and a **YES/NO** command will appear for changing a **YES/NO** condition for a field and an **INCREASE/ DECREASE** command will appear for changing a value field. Use the **TAB** key to move from field to field. Press the **CANCEL** key when finished with the current screen. Press the **NEXT** key to move to a different Limit Screen.

Weld Time Limits:	Sensor Enabled=	<b>YES</b>
Max=#.#	Delay=.	##
Min=#.#	Fault Time=.	##
TAB	<b>YES/NO</b>	CANCEL

Press the  **YES/ NO** soft key to enable or disable a field.

Weld Time Limits:	Sensor Enabled=	<b>YES</b>
Max=#.#	Delay=.	##
Min=#.#	Fault Time=.	<b>00</b>
TAB	<b>INC/DEC</b>	CANCEL

Press the  **INCREASE/DECREASE** soft key to change a value field.


**NOTE:** If the **Remote Pendant Limits (M29)** has been **ENABLED**, the operator will see the **EDIT** function on the limits screen. This will give the operator the ability to **EDIT** the **Max, Min, Delay** and **Fault Time** fields. If **M29** is **DISABLED**, the **EDIT** function will not appear and the operator can

only enable or disable the sensor. To enable or disable this function (M29) see **Chapter 4, System Control Mode Functions**.

Each Limit Screen will display the following:

- **Sensor Enabled** = YES = Enabled NO = Disabled
- **Max** = Maximum parameter limit (use the INCREASE/DECREASE soft key to change the value). Any value above the Maximum value, that exceeds the Fault Time, will generate a fault condition.
- **Min** = Minimum parameter limit (use the INCREASE/DECREASE soft key to change the value). Any value below the Minimum value that exceeds the Fault Time will generate a fault condition.
- **Delay** = The time from the ARC Established conditions being met (ARC On Volts and ARC On Amps) until the START TESTING of data.
- **Fault Time** = This is the time that a parameter must be out of limits (above or below) for a fault to be generated. A value of .01 (one Sample) will fault for any out of limits condition. With a value of .10 the parameter must be out of limits for 10 samples to generate a fault.

**NOTE:** The exception to the **Fault Time** is in the **Weld Time Limits Screen**. In this screen the **Fault Time Limit** is used to determine the **End Time for Testing**. If the entire weld is to be tested for faults set this value to .00. If you wish to test only the first 5 seconds of a 6 second weld you would set the value to 5.00. The last second of the weld would not be tested for faults. If the value is set for .10, only .10 seconds of the weld will be tested for faults.

To Enable or Disable another Sensor or to change any other Sensor values , press the  under the **NEXT** command and the screen will display the status of the next Sensor.

The **Sensor Enable** Screens appear in the following order:

*Weld Time Limits*

*Weld Volts Limits*

*Weld Amps Limits*

*Wire Feed Limits*

*Travel Limits*


*Gas Flow Limits*

*Heat Input Limits*

*Temperature Limits*

*Aux 1 Input Limits (When the DART SENSOR is used with the ADM IV the Aux 1 Input Limits must be ENABLED to TEST the defined Upper and Lower GAS Pressure control limits)*

### Aux 2 Input Limits

Continue to Press the **NEXT** key until all changes have been made. To return to the **IDLE SCREEN** press the  under the **EXIT** command.

## 3.3.2 ACCESSING SYSTEM CONFIGURATION CONTROLS

**Note: Do not try to ALTER ADM IV Parameters or Configuration while the ADM IV is collection and testing weld data (When the ARC is Active). Doing so will cause corrupted data in the ADM IV.**

From any of the control screens (IDLE, WELD DATA, AUX DATA, PULSE WELD, WELD SUMMARY) the operator can select the ALTER button, enter the Password and then select the **CONFIG** function. This function provides the operator the ability to adjust the ADM IV Configuration:

### SCREEN ONE

- **Alarms Enabled** – allows the user to enable or disable the external alarms. When the Alarms are enabled the ADM™ is in the (testing) mode for the Sensors enabled. Select “YES” or “NO” to enable or disable. The default is “NO”.
- **Pulse Weld** – enables or disables the use of Pulse Weld Parameters. Select “YES” or “NO” to enable or disable. The default is “NO”.
- **Save Average** – enables or disables the Save Weld Average into memory. Select “YES” or “NO” to enable or disable. The default is “NO”.
- **Schedule Select** – selects the schedule to be used for the testing of the weld.
- **Min Arc Time** – minimum arc time for a valid weld
- **Sample Time** - sample collection rate

### SCREEN TWO

- **Arc On Volts** - voltage reading that must be exceeded for a valid arc
- **Arc On Amps** – amp reading that must be exceeded for a valid arc
- **Pulse Amps** - pulse current threshold setting – the current level that must be exceeded to indicate a pulse-on condition. This value is used to measure pulse peak and background parameters in the pulse mode.

***Note:** It is important to set the correct pulse current threshold value to collect proper pulse parameters. Set the threshold current approximately 25% above the average current value. Adjust the current threshold value to obtain stable pulse frequency values. The ADM IV™ will calculate pulse frequency by measuring the pulse on and pulse off time period.*

- **Default Travel** – used to set weld travel speed when no travel sensor is in use. A value must be entered to calculate heat.
- **Travel Sensor Scale (Dweld/Dact)** - travel sensor scale. The scale factor is used to calculate the actual rotational travel speed when the sensor is not installed directly on the welding






surface. To determine the correct scale value measure the diameter of drive surface where the sensor is installed. Measure the actual welding surface diameter. Use the following equation to calculate the new scale value:


$$\text{Scale} = (\text{Dia. of actual weld surface}) / (\text{Dia. of measured drive surface})$$

### SCREEN THREE

- **Weld Count** - number of complete welds (each weld must exceed minimum arc time to be a complete weld)
- **Fault Count** - number of fault indications (cumulative – unless reset)
- **Summary Count** – number of weld summaries (averages) stored in memory
- **Printer On** – enable or disable external printer. The default is “NO”.


To move from screen to screen press the  under the **NEXT** command.

To change or alter the condition or value of a parameter press the  under the **EDIT** command on the screen. Once in the **EDIT** mode, use the  under the **TAB** command to move to the parameter that requires change.

If the parameter is controlled by a **YES/ NO** state, a **YES/NO** command will appear at the bottom of the screen. Use the  under the **YES/NO** command to change the status of the parameter.

### EXAMPLE OF EDIT SCREEN (YES/NO)

Alarms Enabled=YES	Pulse Weld=NO
Save Average=YES	Schedule=#
Min Arc Time=#	Sample Time=#
TAB <b>YES/NO</b>	CANCEL

If the parameter is controlled by a numeric value, an **INCREASE** and **DECREASE** command will appear at the bottom of the screen. Press the  under the appropriate command to increase or decrease the value.

### EXAMPLE OF EDIT SCREEN INCREASE / DECREASE

Alarms Enabled=YES	Pulse Weld=NO
Save Average=YES	Schedule=#
<b>Min Arc Time=#</b>	Sample Time=#
TAB <b>INCREASE</b> <b>DECREASE</b>	CANCEL

Press the  key under the **CANCEL** command to **exit** the EDIT mode.

Once a limit has been changed the operator must **EXIT** to the **IDLE** screen for the new limit to take effect. If limit changes are done from the terminal, changes will not take effect until the second weld.

All controls and values that the operator can change from the pendant are performed in the same manner as the above examples. To enter, save, and change a schedule, the operator must use a computer terminal. See Chapter 4 for more information.

### 3.3.3 THE MONITORING STATE

Arc monitoring begins when the ADM IV™ unit recognizes the start of a welding arc based on the user definable threshold current and voltage values. The welding parameters that can be measured and displayed during the weld include:

*Arc time (TIME), measured in seconds.*

*Welding gas flow (GAS), measured in cubic feet per hour / liter per hour.*

*Wire feed speed (WIRE), measured in inches per minute / millimeters per seconds.*

*Welding current (AMP), measured in amps.*

*Welding voltage (VOLT), measured in volts.*

*Weld travel speed (TRAVEL), measured in inches per minute / millimeters per seconds.*

*Surface temperature (TEMP), measured in degrees Fahrenheit /Celsius.*

*Another parameter, welding heat input (HEAT), is not measured. Instead, the HEAT parameter is calculated in K joules/inch based on the voltage, current and travel speed inputs according to the following formula:*

$$\text{HEAT INPUT} = [(\text{VOLT})(\text{AMP})(60)]/[(\text{TRAVEL})(1000)]$$

Each basic welding parameter can be individually enabled/disabled by the operator. Once a welding arc has been detected, the ADM IV™ will measure, display and accumulate data on the various enabled parameters. As soon as the ADM IV™ detects an arc and starts the monitoring process the operator will see the following screen:

*Note: This screen will be displayed until a condition causes the ADM IV™ to switch to another screen or the operator selects another screen by pressing the **NEXT** key.*

#### WELD MONITORING SCREEN

TIME = .#	VOLTS = .#	AMPS = #
WIRE = #	TRAVEL = .#	HEAT = .#
GAS = #	TEMP = #	SCHED = #
ALTER	<b>NEXT</b>	

The values displayed on the weld-monitoring screen represent the real time data being collected by the ADM IV™.

During the monitoring process, if a fault should occur for any of the enabled sensors or parameters a fault status lamp in the **Status Panel** of the ADM IV™ will light red. The ADM IV™ will indicate the parameter that faulted with a **(+)** for a high limit fault and a **(-)** for a low limit fault. Depending on the configuration of the system, the ADM IV can also set a condition to stop the weld process if so desired. When a fault occurs the ADM IV™ will switch to the Faulted Data Screen after the weld process is complete for that weld. At that time the operator can press the key under the **HELP** on the FAULTED DATA Screen and the HELP Screen will display the information programmed by the user for that fault. The “RED” Fault light will remain lit.

**NOTE:** Once a fault has occurred, the **FAULT** light is **RED**, and the ADM IV™ will not log additional data until the fault is cleared. To clear a faulted condition the **REMOTE RESET** or the **AUTO RESET** must be enabled through either the Remote I/O or the terminal program. See **Chapter 4, System Control Mode functions M16 and M17.**

### FAULTED DATA SCREEN

Faulted Data:	TIME = .#	GAS=#	
VOLTS = .#	AMPS = #	WIRE = #	
TRAVEL = .#	HEAT = .#	TEMP= #	
REVIEW	NEXT	HELP	RESET

This screen will display the faulted parameter(s), the values at the time of the **first parameter** that faulted. The faulted parameter will be identified by a + or – indicating a high (+) or low (-) limit fault.

When a Fault is detected the Fault summary screen menu will display a **RESET** soft key. Pressing this key will clear the last fault and reset the fault relays.

To review stored fault data press the **REVIEW** soft key to scroll through all saved files.

The fault screen will remain displayed until another weld is started or the operator presses the **NEXT** button to move to another screen.

Once all of the weld data is collected the operator may use the WELD SUMMARY screen to view the average weld data.

### WELD SUMMARY SCREEN

Weld Summary:	TIME = .#	GAS=#
VOLTS = .#	AMPS = #	WIRE = #
TRAVEL = .#	HEAT = .#	TEMP= #
ALTER	NEXT	

The data displayed on this screen is a summary of the data collected during the previous weld only.



## 4.0 ADM IV OFF-LINE SERIAL TERMINAL PROTOCOL

### 4.1 SERIAL TERMINAL PORT PROTOCOL INTERFACE

The ADM IV™ terminal port is used to off-line program the weld schedule parameters and operating modes / functions. The protocol is a simple ASCII command string that allows the user to upload or download the various data. The user can use any terminal program to perform the programming function. All program command functions are case sensitive. The serial port is configured for the following data format:

*Baud Rate: 9600, Full Duplex*

*Word Length: 8 Data Bits, One Stop and no parity*

*Hand Shaking: None*

### 4.2 PORT PROTOCOL

The protocol consists of a command string and optional data bytes. The command string is an alpha character and an option number followed by a "=" or "?", followed by optional data and terminated with a ASCII "cr" (0dh). The "=" will indicate that data is being sent to the selected parameter / function by the host controller. The "?" will indicate a request for data from the ADM IV™ to the host controller. If the host is sending data to the ADM IV™ the data will be placed after the "=" character and will be an ASCII string terminated with an ASCII "cr" (0dh).

The following is an example of communicating a **VOLT MAX LIMIT** Parameter with the ADM IV™.

To send the Volt Max Limit Parameter to the ADM IV™, send the following command:

*V4=24(cr) - Sent from Host*

To read the Volt Max Limit Parameter from the ADM IV™, send the following command:

*V4?(cr) - Sent from Host  
24 - Received from ADM IV™*

**Note:** "cr" denotes carriage return (Enter)

### 4.3 TERMINAL COMMANDS

The following is a summary of the Terminal Commands supported by the ADM IV™: This command table lists the major categories that are set and changed through the off-line serial terminal port:

COMMAND	DESCRIPTION
"V"	Read/Write Welding Variables
"C"	Calibration Command
"M"	System Control Mode
"R"	Assign Fault Relays
"T"	Set Time (REAL TIME)(hh:mm:ss)
"D"	Set Date (YY/MM/DD)

"O"	Operation Name (Company Name, etc..)
"F"	Read Fault Memory
"P"	Load Fault Message Prompt (Help Screen Display)
"A"	Upload stored Weld Summary Data

All entries or changes to command function values are performed in the same manner as the following example:

To enable or disable the Volt Parameter in the schedule:

Type the following command to check the current value: M2?(cr)

The system responds with the current value in memory: 0 (disabled)

Type the following command to change the value: M2=1(cr)

Type the following command to check the new value: M2?(cr)

The system responds with the current value in memory: 1 (enabled)

**Note:** "cr" denotes carriage return (Enter)

The following is a summary of the command functions:

#### Set Time:

To set the time (hour/minute/second) type: T=10:17:35 (cr)

Entire field must be completed as explained below:

Type 6:45 am as T=06:45:00

Type 7:25 PM as T=19:25:00

**Note:** "cr" denotes carriage return (Enter)

#### Set Date:

To set the date (year/month/day) type: D=99/06/01 (cr)

Entire field must be completed as explained below:

Type February 4, 1999 as D=99/02/04

Type November 23, 2000 as D=00/11/23

**Note:** "cr" denotes carriage return (Enter)

#### Set Operation Name:

To set the operation name: (Maximum of 40 characters)

Type the following command to check the current value: O?(cr)

The system responds with the current text in memory: Computer Weld Technology, Inc.

Type the following command to change the value: O=Your Own Text

Type the following command to check the new value: O?(cr)

The system responds with the current text in memory: Your Own Text

**Note:** "cr" denotes carriage return (Enter)

**A1 – A190** This serial command allows the user to up load any stored Weld summary data to a host controller. To upload a specific weld summary type the following command: A###? (enter). Where ### is the stored weld summary number to

send (Number Range 1 – 190). If the weld has been stored the ADM IV will send the data string to the host. The format of the data is as follows:

*[Weld Number] [Schedule] [Time] [Stored Average Weld Data]*

**NOTE:** *The Save Averages option must be active to use this function.  
(M21=1)*

**C1 – C12** Calibration Values where:

- C1 = Arc Voltage zero value
- C2 = Arc Voltage gain value
- C3 = Arc Current zero value
- C4 = Arc Current gain value
- C5 = Gas Zero value
- C6 = Gas Gain value
- C7 = Temperature Zero value
- C8 = Temperature Gain value
- C9 = AUX 1 Zero value
- C10 = AUX 1 Gain value
- C11 = AUX 2 Zero value
- C12 = AUX 2 Gain value

*NOTE: All calibration values are set at the factory. The values displayed are for reference only. Consult the factory prior to changing any of these values.*

**M1 – M36** System Control Mode functions (ENABLE/DISABLE SENSORS):

The following functions are used to enable sensors, select operation modes and select sensor types.

To enable a sensor it must equal = 1

To disable a sensor it must equal = 0

- M1 = Arc Time Parameter (Enable = 1 / Disable = 0)  
(DEFAULT = 1)
- M2 = Volt Parameter (Enable = 1 / Disable = 0)  
(DEFAULT = 1)
- M3 = Amp Parameter (Enable = 1 / Disable = 0)  
(DEFAULT = 1)
- M4 = Gas Parameter (Enable = 1 / Disable = 0)  
(DEFAULT = 1)
- M5 = Temperature Parameter (Enable = 1 / Disable = 0)  
(DEFAULT = 0)
- M6 = Aux 1 Parameter (Enable = 1 / Disable = 0)  
(DEFAULT = 0)
- M7 = Aux 2 Parameter (Enable = 1 / Disable = 0)  
(DEFAULT = 0)
- M8 = Travel Speed Parameter (Enable = 1 / Disable = 0)  
(DEFAULT = 0)
- M9 = Wire Speed Parameter (Enable = 1 / Disable = 0)  
(DEFAULT = 1)
- M10 = Heat Input Parameter (Enable = 1 / Disable = 0)  
(DEFAULT = 0)
- M11 = Set GTAW Mode (Enable = 1 / Disable = 0)  
(DEFAULT = 0)

- M12 = Set GMAW Mode (Enable = 1 / Disable = 0)  
(DEFAULT = 0)
- M13 = Pulse Data (Enable = 1 / Disable = 0)  
(DEFAULT = 0)
- M14 = Set Remote Schedule Selection (Enable = 1 / Disable = 0)  
(DEFAULT = 0)
- M15 = Set Remote Arc On (Enable = 1 / Disable = 0)  
(DEFAULT = 0) (Input Bit 7)
- M16 = Remote Reset (Enable = 1 / Disable = 0)  
(DEFAULT = 0) (Input Bit 8)
- M17 = Auto Reset (Enable = 1 / Disable = 0)  
(DEFAULT = 1)
- M18 = Metric Mode (Enable = 1 / Disable = 0)  
(DEFAULT = 0)
- M19 = Set Network Cell ID (Enter number from 1–255 for Cell ID)  
(DEFAULT = 0)
- M20 = Set Temp Sensor Type (Infrared = 0 / Thermocouple = 1)  
(DEFAULT = 0)
- M21 = Data Upload to Terminal (data from ADM™ to terminal)  
(Enable for all weld data = 1 /  
Enable for summary weld data = 2 /  
Enable for Both = 3 / Raw Data = 4 / Disabled = 0)  
(DEFAULT = 0)
- M22 = Data Upload to Network  
(data from ADM to terminal through network port)  
(Enable for all weld data = 1 /  
Enable for summary weld data = 2 /  
Enable for both = 3 / Disable = 0)  
(DEFAULT = 0)
- M23 = 40 Column Print (Enable = 1 / Disable = 0)  
(DEFAULT = 0)
- M24 = Print Summary Data (Enable = 1 / Disable = 0)  
(DEFAULT = 0)
- M25 = Print All Data (Enable = 1 / Disable = 0)  
(DEFAULT = 0)
- M26 = Save Average Weld Data (Enable = 1 / Disable = 0)  
(DEFAULT = 0)
- M27 = Schedule (Enter a number from 1 to 64)
- M28 = Data Collection Rate Timer (in 10 msec Increments)  
(DEFAULT = 10)
- M29 = Remote Pendant Limits Edit (Enable = 1 / Disable = 0)  
(DEFAULT = 1)
- M30 = Printer (Enable = 1 / Disable = 0)  
(DEFAULT = 0)
- M31 = Read/Write selected weld schedule  
(Read Schedule = 1 / Write schedule = 2)
- M32 = Set Baud Rate (DEFAULT = 0 ) ( 0 = 9600, 1 = 19200 )  
(After setting this value, the ADM VI must be powered down  
and back up for the setting to take effect. You must go to the  
Comm Menu in the ADMSTAT Plus and select the  
Properties option from the pull down menu. Set the  
Maximum Speed to match the value selected with M32)
- M33 = Clear Memory ( **2** = clear Weld Schedules and Weld  
Memory and load factory default values, **3** = clear  
Configuration parameters, Weld Schedules and Weld



Memory and load factory default values, 4 = clear Sensor scale parameters (Calibration), Configuration parameters, Weld Schedules and Weld Memory and load factory default values) (After setting this value, the ADM VI must be powered down and back up for the setting to take effect)

\*\*\*\* **Available only with Version 1.33 and higher Firmware** \*\*\*\*

M34= Enable Station number indication of multiple weld stations on a single fixture. Setting this to 1 will enable the “-A” and “-B” weld station depending to the ADM Station ID number. This function uses “INP 7” to select A or B station. Setting the INP 7 to 0 will select “-A” . Setting INP 7 to 1 will select “-B” identification. The Remote Arc On function must be disabled (M15=0)

M35= Read remote switch input status. “ **M35?**” will display the current status of the ADM remote Inputs.

M36= Enable Alarms. (Enable = 1 / Disable = 0) This mode must be set by ADM IV Schedule. To enable the alarms for a schedule type the following: M27=# <enter> (# is the schedule number that the Alarms are to be enabled for), M31=1 <enter> (to read the schedule), M36=1 <enter> (to enable the alarms) or M36=0 <enter> (to disable the alarms), M31= 2 <enter> (to write the schedule back to the ADM IV)

\*\*\*\* **Available only with Version 1.56 and higher Firmware** \*\*\*\*

M37= Enable scaling for A3A0263 Travel speed sensor. M37=0 enables the standard ADM travel speed sensor A3A0112. M37=1 enables the scaling for the A3A0263 Travel speed sensor (Default=0)

**NOTE:** *If the remote fault reset and the auto fault reset are disabled, the only way to reset the system is to DISABLE the ALARMS from the Remote Pendant Panel or to enable the remote fault reset (M16) or auto fault reset (M17) from a computer terminal.*

## R1 – R12

Fault Relay Enable/Disable

ADM IV™ has 8 fault output relays that can be assigned to specific parameter faults. When a fault occurs the corresponding relay(s) enabled will be set. This output can provide an external fault indication. A relay must be assigned to a specific parameter fault condition to enable this function. Any Parameter fault can have multiple relay outputs assigned.

**NOTE:** *The ADM IV will not collect data if a Fault Occurs and a Fault Reset is not issued.*

**R1** - Arc Time Fault Relay

**R2** - Volt Fault Relay

**R3** - Amp Fault Relay

**R4** - Gas Fault Relay

**R5** - Temp Fault Relay

**R6** - Aux 1 Fault Relay

**R7** - Aux 2 Fault Relay

**R8** - Travel Speed Fault Relay

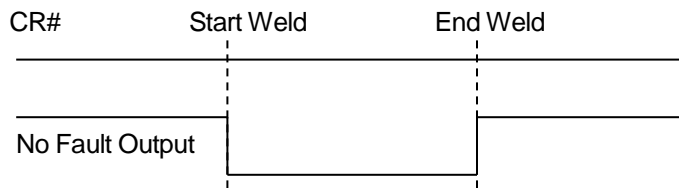
**R9** - Wire Feed Speed Fault Relay

**R10 - Heat Input Fault Relay**

**R11 - Is a NO Fault output that will provide an output HIGH condition until an ARC Start is detected. At that point the output signal will go LOW. If NO Faults occur during the weld, the Output will return to a HIGH state at the end of the weld. If a Fault occurs, the Output will remain LOW until a Remote Fault Reset is received or the Fault Reset soft key is pushed from the ADM IV Pendant key pad. R11 will not reset (HIGH) when an Auto Fault Reset is issued unless a complete weld is conducted without faults. R11 will reset (HIGH) at the end of the completed NO Fault weld. See diagram below.**

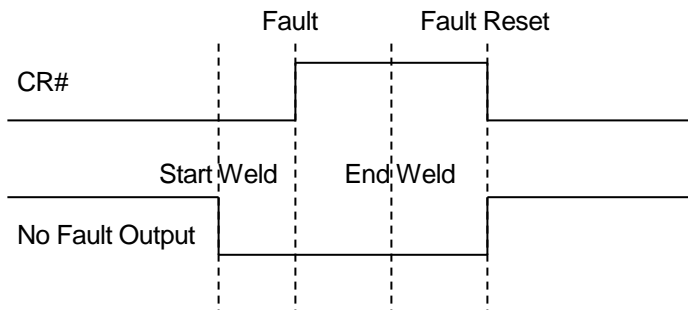
**R12 - Is the ADM IV Ready Output. When used the Output will be HIGH unless the ADM is turned off or not in an operational status**

CR# Output with NO Faults detected:



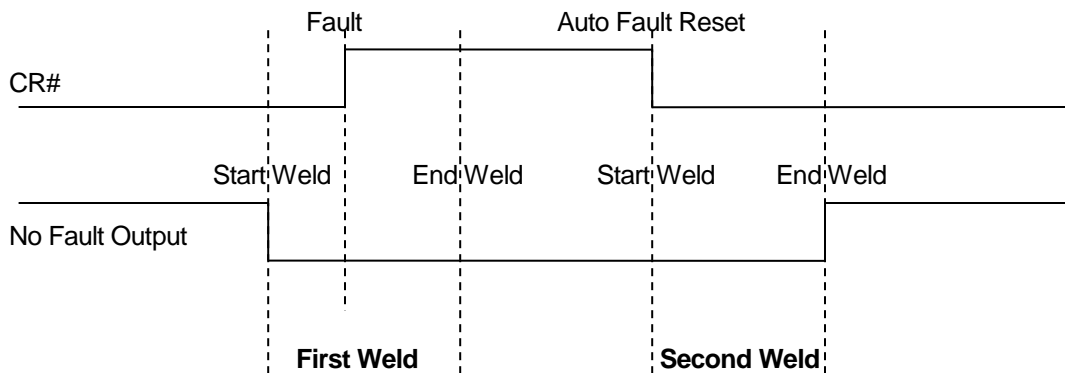
No Fault Output with No Fault detected.

CR# With Fault detected and Reset using Remote Fault Reset or Fault Reset from Pendant



NO Fault Output with Fault detected and Reset using Remote Fault Reset or Fault Reset from Pendant

CR# With Fault Detected and Reset using Auto Fault Reset



NO Fault Output with Fault detected and Reset using Auto Fault Reset.

**CR# = Any Selected Fault Relay Output ( 1 – 8 ).**

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The assignment of relays to a parameter fault indication is by the decimal value of the desired relay. As an example: to enable Arc Time Fault output to activate CR1 you enter the following values for R1 (Arc Time Fault Output):

**R1=1(enter)**

To assign multiple relays you combine the decimal values of the individual relays. As an example to set CR2 and CR3 when a Gas fault occurs enter the following for R4 (Gas Fault output)

**R4=6(enter)**     Where: CR2=2 and CR3=4 (2 + 4 = 6)

The following is the decimal value for individual bits used for the relay outputs:

<i>BIT NUMBER</i>	<i>DECIMAL</i>	<i>RELAY SWITCH</i>
<i>BIT 0</i>	1	<i>CR1</i>
<i>BIT 1</i>	2	<i>CR2</i>
<i>BIT 2</i>	4	<i>CR3</i>
<i>BIT 3</i>	8	<i>CR4</i>
<i>BIT 4</i>	16	<i>CR5</i>
<i>BIT 5</i>	32	<i>CR6</i>
<i>BIT 6</i>	64	<i>CR7</i>
<i>BIT 7</i>	128	<i>CR8</i>

**V1 – V53**

Variable Parameters (MAX/MIN SETTINGS):

V1 = Time Max Limit (DEFAULT = 51)

V2 = Time Min Limit (DEFAULT = 49)

V3 = End Test Time (DEFAULT = 0)

V4 = Volt Max Limit (DEFAULT = 205)

V5 = Volt Min Limit (DEFAULT = 185)

V6 = Volt Start Test Delay Time (DEFAULT = 40)

V7 = Volt Fault Time (DEFAULT = 10)

V8 = Amp Max Limit (DEFAULT = 300)

V9 = Amp Min Limit (DEFAULT = 280)

V10 = Amp Start Test Delay Time (DEFAULT = 40)

V11 = Amp Fault Time (DEFAULT = 10)

V12 = Gas Max Limit (DEFAULT = 45)

V13 = Gas Min Limit (DEFAULT = 35)

V14 = Gas Start Test Delay Time (DEFAULT = 50)

V15 = Gas Fault Time (DEFAULT = 10)

V16 = Temp Max Limit (DEFAULT = 600)

V17 = Temp Min Limit (DEFAULT = 100)

V18 = Temp Start Test Delay Time (DEFAULT = 40)

- V19 = Temp Fault Time (DEFAULT = 10)
- V20 = Aux 1 Max Limit (DEFAULT = 800)
- V21 = Aux 1 Min Limit (DEFAULT = 200)
- V22 = Aux 1 Start Test Delay Time (DEFAULT = 40)
- V23 = Aux 1 Fault Time (DEFAULT = 10)
- V24 = Aux 2 Max Limit (DEFAULT = 900)
- V25 = Aux 2 Min Limit (DEFAULT = 100)
- V26 = Aux 2 Start Test Delay Time (DEFAULT = 40)
- V27 = Aux 2 Fault Time (DEFAULT = 10)
- V28 = Travel Max Limit (DEFAULT = 125)
- V29 = Travel Min Limit (DEFAULT = 115)
- V30 = Travel Start Test Delay Time (DEFAULT = 40)
- V31 = Travel Fault Time (DEFAULT = 10)
- V32 = Wire Feed Speed Max Limit (DEFAULT = 550)
- V33 = Wire Feed Speed Min Limit (DEFAULT = 500)
- V34 = Wire Feed Speed Start Test Delay Time (DEFAULT = 40)
- V35 = Wire Feed Speed Fault Time (DEFAULT = 10)
- V36 = Heat Max Limit (DEFAULT = 350)
- V37 = Heat Min Limit (DEFAULT = 330)
- V38 = Heat Start Test Delay Time (DEFAULT = 40)
- V39 = Heat Fault Time (DEFAULT = 10)
- V40 = Pulse Amps (DEFAULT = 250)
- V41 = Travel Sensor Scale (DEFAULT = 0)
- V42 = Min Arc Time (DEFAULT = 5)
- V43 = Sample Time (DEFAULT = 1)
- V44 = Default Travel (DEFAULT = 0)
- V45 = Station (DEFAULT = 0)
- V46 = Print Time (DEFAULT = 0)
- V47 = Password (DEFAULT = 0)
- V48 = Arc On Volts (DEFAULT = 40)
- V49 = Arc On Amps (DEFAULT = 10)
- V50 = Fault Count (DEFAULT = 0)
- V51 = Weld Count (DEFAULT = 0)
- V52 = Summary Count (DEFAULT = 0)
- V53 = Weld Data Memory Count (DEFAULT = 0)

**P1 – P18**

Help Screen Data Entry:

The ADM IV™ provides the user with the ability to program 18 different “HELP” screens to provide the operator with help when a fault occurs. Each screen can deliver a 100-character message as entered by the user. This allows the user the ability to provide assistance to the operator during a fault situation.

- P1 = Arc Time Max Fault (DEFAULT DISPLAY: Check end weld limit or position)
- P2 = Arc Time Min Fault (DEFAULT DISPLAY: Check end weld position and wire drive system)
- P3 = Volts Max (DEFAULT DISPLAY: Check power source and voltage settings)

- P4 = Volts Min (DEFAULT DISPLAY: Check welding grounds and voltage settings)
- P5 = Amps Max (DEFAULT DISPLAY: Check torch height, part position, and program points)
- P6 = Amps Min (DEFAULT DISPLAY: Check torch height, wire drive system and program points)
- P7 = Gas Max (DEFAULT DISPLAY: Check gas flow regulator)
- P8 = Gas Min (DEFAULT DISPLAY: Check torch, gas hose and flow regulator)
- P9 = Temp Max (DEFAULT DISPLAY: Blank)
- P10 = Temp Min (DEFAULT DISPLAY: Blank)
- P11 = Aux 1 Max (DEFAULT DISPLAY: Blank)
- P12 = Aux 1 Min (DEFAULT DISPLAY: Blank)
- P13 = Aux 2 Max (DEFAULT DISPLAY: Blank)
- P14 = Aux 2 Min (DEFAULT DISPLAY: Blank)
- P15 = Travel Max (DEFAULT DISPLAY: Blank)
- P16 = Travel Min (DEFAULT DISPLAY: Blank)
- P17 = Wire Feed Max (DEFAULT DISPLAY: Check Programmed wire feed speed and control)
- P18 = Wire Feed Min (DEFAULT DISPLAY: Check torch liner, conduit assembly and wire drive feed rolls)