
AE44-503J SERIES
PRODUCTION MONITORING DISPLAY SYSTEM
(INCLUDES AE4X46-503J REMOTE DISPLAY)

**AE44-503J PRODUCTION DISPLAY SYSTEM
REV 07/10/06**

DESCRIPTION

The AE44-503J Series Production Display System is a stand-alone production pacing (Goal) and monitoring (Actual) display. It includes a four digit red display for the Production Goal and a four digit green display for the Production Actual Count. The Production Goal is adjustable to provide from one count per second to one count every 9999 seconds. The digits are four inches high and are visible up to 200 feet away.

This manual will use the term "the AE DEVICE", in some cases to cover all versions of displays.

The model numbers of the AE44-503J Series are derived from the digit size and the number of digits in each line of the display, followed by the suffix 503J. For example the AE44-503J is a Four Inch, Four-Digit display. For two-sided versions, the model number would have /2. For example: AE44/2-503J would be the model number for a Two-Sided, Four Inch, Four Digit Production Display System. For your specific model number and hardware configuration refer to the drawings at the back of this manual.

For multiple display systems, remote displays can be added at distances up to 2000 feet away. These are available in sizes ranging from 1" high to 12" high digits.

The AE44-503J Series Production Display Systems are factory configured with RS485 I/O for computer data acquisition and control. It is also configured with an RS232 output for transmitting display data to a remote display, such as the AE4X46-503J Remote Display.



AE44-503J PRODUCTION MONITORING DISPLAY

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SPECIFICATIONS

Digits: Four Inch High, Seven Segment Digits. Red dot LED's for the Goal and Green dot LED's for the Actual.

Number of Digits: Two lines with four digits per line. See the drawings at the back of this manual for your specific model.

GOAL (RED)

Count Rate: Four BCD Push-Wheel Switches are provided to adjust Goal Count Rate from 1 count per second to 1 count per 9999 seconds. When the RUN/HOLD switch is set to the RUN mode, the Goal display will begin to count at the rate selected.

ACTUAL (GREEN)

Count Up/Down Rate: Up to 25 pulses per second (25Hz)

Count Up/Down Signal: 12V DC to 30V DC pulse (>20 msec),
Can be jumpered for NPN or PNP transistor, or dry contact closure input. See the cable-wiring tables in the WIRING section of this manual.

Run/Hold: A Run/Hold switch is provided. In the Hold position the Goal Count is stopped. Actual Count is NOT stopped.

Resets: Built-In front panel reset push buttons are provided for Goal Reset and Actual Reset.

Power: 120 VAC, 60 Hz (20VA). Eight-foot power cord is provided. Optional power includes 50 HZ, 12 VAC, 12 to 15 VDC and 220 VAC.

Accuracy: Synchronous with the AC power line when power is applied. On battery backup a 0.005% crystal time base is used.

Battery standby: Self-charging, 9V Ni-Cad.

Operating Temperature: 0 to 50 Degrees C

Enclosure: Painted Black 18GA Steel with .118" thick acrylic lenses. The front and back panels are removable. See the drawings at the back of this manual.

Mounting Holes (1/4" Dia.) are provided on the back panel.

Signal Wiring: All signal wiring is accessible at terminal blocks on the 503 interface board located inside the enclosure on the back panel.

RS485 I/O: Provides an I/O Interface for the AE44-503J. This allows a host device such as a PC, to communicate with one or more (up to 32) AE44-503J's with RS485 I/O installed. AEQuery software version 1.05 or higher and

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an RS232/485 I/O Adapter (ATS P/N: 9200-0509) are required. The software uses the computer's RS232 port via the RS232/485 adapter to send and receive data from up to 32 individually addressed AE Devices. AEQuery can send and store the Goal and Actual counts, Interval and Actual switch settings, and run time of each AE Device on the system. AEQuery can also clear (reset to zero) the run time of one or all AE devices as well as reset the goal and actual counts . The data collected can be printed or saved to a file for use by other programs.

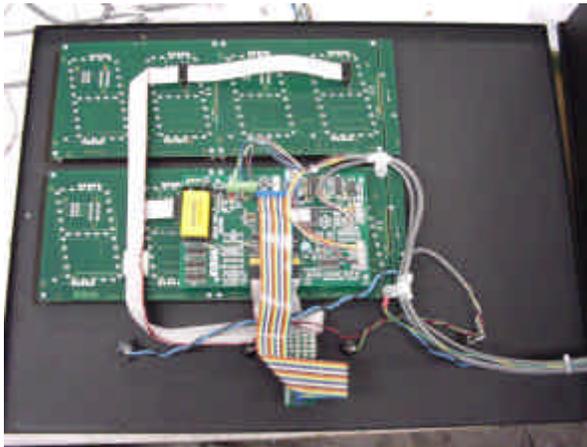
For any other options refer to the drawings at the back of this manual for additional specifications.

INSTALLATION

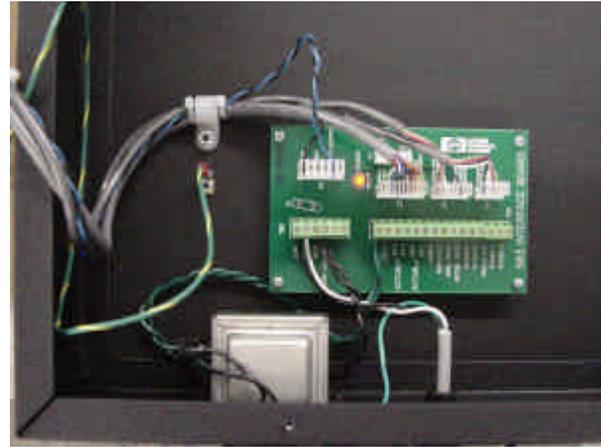
ASSEMBLY / DISASSEMBLY

The AE44-503J Display is assembled in 2 major parts : (1) the front panel with displays and controller board, (2) the back panel with enclosure ring, transformer and 503 interface board with terminal blocks.

The AE44-503J Display may be easily disassembled and the 503 accessed by removing the (6) screws holding on the front panel and gently lifting it from the enclosure ring. Cables with connectors are used to provide connection between the front and back panel, which may be disconnected and reconnected if needed to ease mounting and wiring of the display.



**FRONT PANEL SHOWING DISPLAYS AND
CONTROLLER BOARD**



**BACK PANEL SHOWING
503 INTERFACE BOARD**

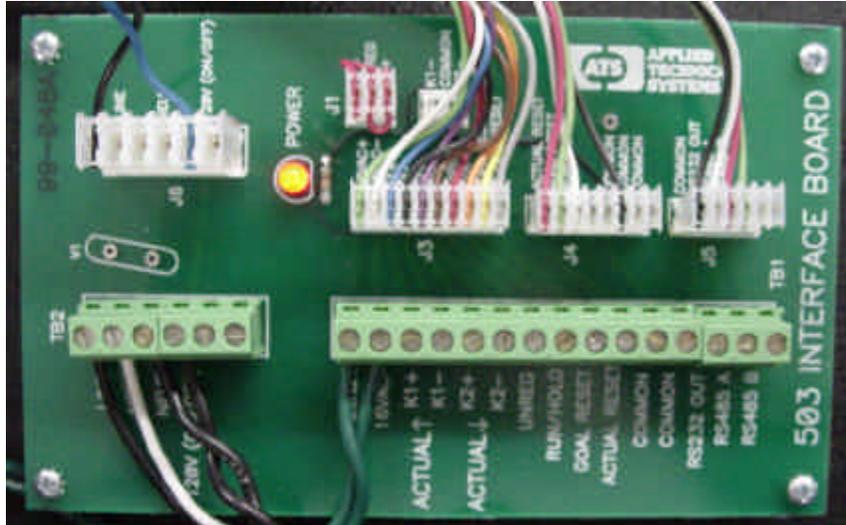
MOUNTING

The AE44-503J Display can be mounted using the ¼-20 mounting studs through the ¼" holes on the back panel. Things to consider for mounting include ambient light, viewing area, ambient temperature, dirt or dust. Refer to the specific drawings.

WIRING

An AC power cord is provided for the 120 VAC power which is terminated on terminals 1 and 2 on TB2 of the 503 interface board. For other power configurations, refer to the specific wiring diagrams provided.

All field wiring and signal I/O, including RS232 output, RS485 I/O, Goal Reset, Actual Reset, Run/Hold, Count Up and Count Down signals are pre-wired to terminals located on TB1 on the 503 interface board. Unreg DC power and Common are also pre-wired to TB1 for powering sensors and contact closure inputs. Refer to the terminal block wiring tables below:



TB1

TB2

TERMINAL BLOCK : WIRING TABLE

<u>TB1</u>	<u>Function</u>	<u>TB2</u>	<u>Function</u>
1	16VAC+ (PREWIRED)	1	LINE
2	16VAC- (PREWIRED)	2	NEUTRAL
3	K1+ (COUNT UP)	3	NEUTRAL
4	K1- (COUNT UP)	4	120V (ON/OFF)
5	K2+ (COUNT DOWN)		
6	K2- (COUNT DOWN)		
7	UNREG		
8	RUN/HOLD		
9	GOAL RESET		
10	ACTUAL RESET		
11	COMMON		
12	COMMON		
13	RS232 OUT		
14	RS485 (A)		
15	RS485 (B)		

On standard units, TB2 is pre-wired to a power cord and the front panel ON/OFF switch.

SETTING THE COUNT INPUT LOGIC:

For negative true logic input (NPN transistor or dry contact to COMMON); install jumper at J1 on 503 interface board. (Factory configured for negative true logic). Do not make any connections to K1+ or k2+ when configured for negative true input.

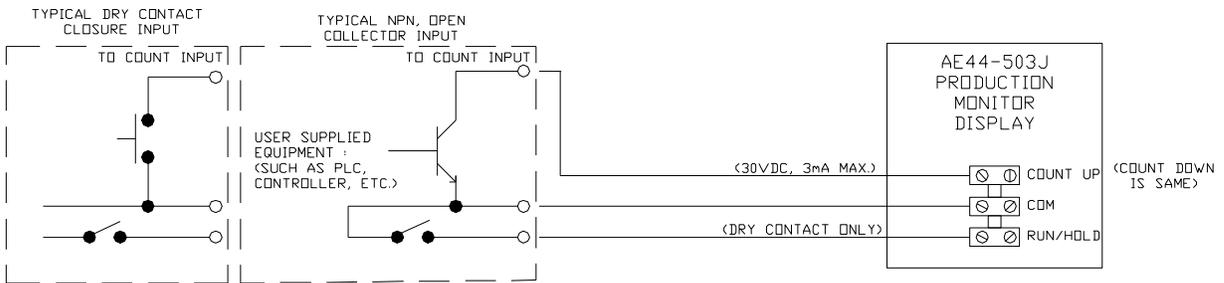
For positive true logic input (PNP transistor or dry contact to UNREG); install jumper at J2 on 503 interface board. Do not make any connections to K1- or K2- when configured for positive true input.

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Wiring Examples:

To connect an NPN transistor to the Count Up Input, connect terminal 4 on TB1 to the transistor's collector and terminal 12 on TB1 to the transistor's emitter.

To connect a dry contact push button switch to the Count Up Input, connect one side of the switch to terminal 4 on TB1, and connect the other side of the switch to terminal 12 on TB1.



TYPICAL WIRING EXAMPLES : COUNT AND RUN/HOLD INPUTS

To connect the AE44-503J to a remote display, connect terminal 11 on TB1 to the signal common on the remote display terminal block and terminal 13 on TB1 to the signal receive on the remote display terminal block.

OPERATION

Before applying power, be sure all wiring is completed. Apply 120 VAC power to the unit. The Goal display will show "V XX" (XX = current software version) during power-up for a few seconds. Nothing will appear on the Actual display. After power-up both displays will show all zeros. If a charged battery is installed, the power-up will be bypassed.

SETTING THE GOAL COUNT RATE

Set the Run/Hold switch to the Hold position. Set the desired Goal Count rate (interval) using the Push-Wheel switches. The rate entered does not take effect until the Run/Hold switch is set to the Run position. The rate cannot be changed on the fly (unless using AEQUERY software). Any changes made to the rate while in the Run position will be ignored until the Run/Hold switch is set to Hold and then back to Run.

Each Push-Wheel switch has a range of 0 through 9. A setting of 00 or 01 will cause the Goal display to increment by one count every second when the Run/Hold switch is set back to the Run position (a setting of 00 defaults to 01). A setting of 99 will cause the Goal to increment by one count every 99 seconds. When using AEQUERY software, all commands via computer will override any manual commands previously entered. AEQUERY software also allows the rate to be changed without having to flip the Run/Hold switch.

GOAL RESET

Press the Goal Reset push button on the front panel to reset the Goal count to 0000. The Goal count can also be reset via computer using AEQUERY software.

GOAL HOLD

Set the Run/Hold switch to the Hold position. The Goal display will stop incrementing until the Run/Hold switch is switched back to the Run position. Note that the Actual count can continue to be updated while the Run/Hold switch is in the Hold position. The Run/Hold function can also be controlled via computer using AEQUERY software. However, if sending data via AEQUERY the Run/hold switch must be in the Run position for the Goal display to increment.

USING THE COUNTER (ACTUAL)

Apply the COUNT UP (K1-) or COUNT DOWN (K2-) signal by push button or transistor. The Actual display will increment or decrement by one count each time the Count Up or Count Down signal is applied. Both the Count Up and the Count Down inputs will handle up to a 25Hz input frequency.

ACTUAL RESET

Press the Actual Reset push button on the front panel to reset the Actual count to 0000. The Actual count can also be reset via computer using AEQUERY software.

NOTE. If it is desired to reset both displays at once, one Reset button will need to be pressed a fraction of a second before the other. If both Reset buttons are pressed at the same time, the address of the device will be displayed.

POWER LOSS

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If power is lost, a rechargeable battery backup system will store both counts for up to four hours. Also the COUNT and RESET signals are functional during power loss. For systems using active signal inputs, the COUNT and RESET functions will continue as long as the signal inputs are applied.

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REMOTE DISPLAY

To view the same data seen on the Goal and Actual displays on another remote display, connect the RS232 output to the RS232 input of an AE Series Remote Display (Goal = address 1, Actual = address 2). Each remote display is configured at the factory for its specific application. See "Remote Display" section of manual for further details.

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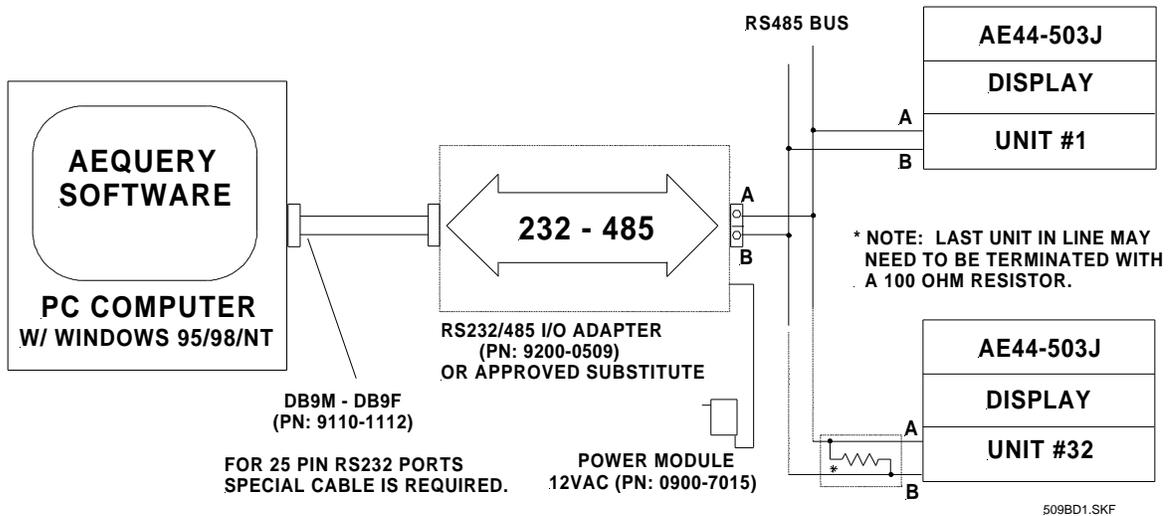
RS485 I/O

RS485 communication provides an I/O Interface for the AE44-503J. This allows a host device such as a PC to communicate with one or more (up to 32) AE44-503J's. AEQuery version 1.05 software and an RS232/485 I/O Adapter (ATS P/N: 9200-0509) are required. The software uses the computer's RS232 port to send and receive data from up to 32 individually addressed AE Devices. AEQuery can send and store the Goal and Actual counts, Goal and Actual interval and rate settings, and run time of each AE Device on the system. AEQuery can also reset the goal and actual counts. This data can be printed or saved to file for use by other programs. AEQuery can also clear (reset to zero) the run time of one or all AE devices.

Installation

This feature is factory installed in the AE44-503J. Connection is required from terminal 14 (A) and 15 (B) on TB1 to terminals A and B on the RS232/485 I/O Adapter (ATS P/N: 9200-0509). Up to 32 AE44-503J's can be connected in parallel (multi-dropped) to a single computer via the RS232/485 Adapter. The Adapter connects to one of the computer's RS232 ports. The Adapter requires 12 VAC power. A 12 VAC Power Module (ATS P/N: 0900-7015) is supplied with the Adapter. See the block diagram below:

NOTE: A 100 ohm resistor may be required across lines A and B at the unit that is most distant from the computer.



RS485 BLOCK DIAGRAM

SETTING THE UNIT ADDRESS

To set the address of an AE44-503J:

Place the Run/Hold switch in the Hold position.

Set the push-wheel switches to the desired address (example: 05 for address 5).

Then press both the Goal and Actual reset buttons at the same time, then release. The new address is now stored in non-volatile memory. The previous address will be displayed at this time.

Finally, place the Run/Hold switch back to the Run position.

WARNING. Be sure each AE Device on the system has a unique address. If two or more units on the system have the same address, the data acquired from these units will be unreliable. Normally it will be garbled. Even if good data is received, one can't be sure which of the conflicting units it came from.

CHECKING THE CURRENT UNIT ADDRESS

WARNING. The unit address must be checked in the Run position. Since the Reset switches are used to check the address, both the GOAL and ACTUAL counts will be reset to zero when checking the address.

To check the unit address:

Place the Run/Hold switch in the Run position.

Press and hold both the Goal and Actual reset buttons at the same time.

The displays will read the address stored.

Release both Reset buttons.

AEQUERY SOFTWARE

AEQuery version 1.05 software, when used with the RS232/485 Adapter, will allow a computer to communicate with up to 32 different AE44-503J's. This software uses one of the PC's serial ports, for communication with the AE Device.

Installation

AEQuery is usually provided on CD ROM, but floppy disks are available on request. Run "setup" and follow the installation wizard. Once the copying of files from the CD is complete, Windows will begin Setup Wizard. The Setup Wizard will allow you to create your own directory to install the AEQuery software or it will default to the following directory C:\ProgramFiles\AEQuery\.

Operation

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Once the system of AE44-503J's with RS485 I/O and the AEQuery software are installed, click on AEQuery in the Programs list to start the program. Click on "Setup" and choose the desired RS232 port (Com1 to Com 8). Once the Com Port is selected, the user can specify a desired Time Out setting (typically shorter for slower computers and longer for faster computers). The Time Out has a default setting and should not need adjusting unless "No Data" is repeatedly being received.

SETTING POLARITY

Click "Setup" again to change the RTS Polarity if necessary. Some RS485 adapters use Positive True logic while others use Negative True logic for the RTS signal. **The ATS adapter (P/N 9200-0509) is a negative true device.** Other approved adapters may use positive true logic device. Click "RTS". Click either "Positive True" or "Negative True". Choosing the wrong polarity will not damage anything. It will only result in the scans producing "No Data".

SETTING ADDRESS GROUP

Enter "Setup" once again and enter the desired Address Group. The Address Group defines which addresses (1-32 available) the user wishes to readily access and scan. The user may select a single address, a group of addresses (in any order) or All of the addresses. The Address Group selected will be the only addresses scanned in a "Query Group" and included in a Total count for the Goal and Actual Totals.

PRESETTING GOAL AND ACTUAL DISPLAYS

Click on "utilities" and then "preset units" to preset AE devices. The user may select a single address, a group of addresses, or all addresses to send data to. The Actual and Goal displays can be preset to display any number between 0000 and 9999. Simply enter the desired preset number into the number field next to goal or actual and click on the arrow next to the number field to send the desired preset to the AE device. The Goal interval and Actual rate can be set in the same manner.

RESETTING GOAL AND ACTUAL DISPLAYS

Both Goal and Actual displays can be reset by entering 0 into the preset number fields.

RUN/HOLD FUNCTION

The Run/Hold function can be used by clicking on "menu" then "toggle" then "Run/Hold", or by clicking on the pause tool-bar button. The Run/Hold function can be used on a single address, a group of addresses, or all addresses. Note: The Run/Hold function only applies to the Goal display and the Run/Hold button on each AE device must be in the run position to begin incrementing once in the Run mode.

CLEARING RUN TIME

The Run time can also be cleared in this menu by clicking on the clock tool-bar button.

ACQUIRING DATA

Click on either the "Query One" or "Query Group" buttons to acquire data from the AE44-503J's. If the Address Group has not been set, you will be prompted to set it. The data will begin to show up on the screen arranged in columns. Figure 1 below shows an example of scanning 8 units, addresses 1-8. If "Query One" is selected, you will be prompted for the address of the unit to be scanned. If an address is selected that is not an available address as set in the Address Group, you will be prompted to reselect an address.

The screenshot shows the 'AEQuery - AE Data Capture Application' window. At the top, there is a menu bar with 'File', 'Setup', 'Utilities', and 'Help'. Below the menu bar is a text input field containing '000010001004500000004' and two buttons: 'Scan One' and 'Scan Group'. The main area of the window contains a table with the following data:

Unit Address	Interval (Seconds)	Actual Switch	Goal Display	Actual Display	Run Time (Minutes)	Time	Date
1	1	1	53	0	197	13:51:57	01-15-2001
2	8888	1	38	0	197	13:51:57	01-15-2001
3	8888	1	6244	0	197	13:51:57	01-15-2001
4	8888	1	6178	0	197	13:51:58	01-15-2001
5	8888	85	6190	0	197	13:51:58	01-15-2001
6	1	1	61	0	197	13:51:58	01-15-2001
7	1	1	203	0	197	13:51:58	01-15-2001
8	1	1	69	0	4	13:51:58	01-15-2001

At the bottom of the window, there is a status bar that reads: 'To begin, click one of the scan buttons above.'

Figure 1 – Formatted Data Form

To print a report of the displayed data, click “File” and then select “Print” from the pull-down menu. The data can now be saved as a comma-separated value (“.csv”) file which can then be reopened by AEQuery or used with other programs such as EXCEL for other data reports. To save the data, click on “File” and choose “SaveAs” from the pull-down menu. Save the data to a filename of your choice. To open a file, click on “File”, and select “Open” from the pull-down menu. Choose the desired file to open.

CLEARING THE RUN TIME

To clear the run time (reset it to zero) of one unit:

1. Click “Utilities”.
2. Click “Clear Run Time”.
3. Click “Clear One Unit”.

You will be prompted for the address of the unit that you want to clear.

To clear the run time (reset it to zero) of all units (addresses 1 – 32):

1. Click “Utilities”.
2. Click “Clear Run Time”.
3. Click “Clear All Units”.

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DISPLAYING TOTALS

To display the totals (of all Production Goal and Actual Counts) on the Remote Display or on the lower portion of the open AEQuery program window.

1. Click "Utilities".
2. Click "Display Totals".
3. Enter Interval which to update Totals (1-99 minutes).
4. Click "OK"

At the specified interval, a window will appear while the total is being calculated. The window will allow the user to "Skip" that calculation, or "Stop" calculating totals at that time. If nothing is clicked, then the totals will continue to be calculated at the specified interval.

Note: The totals will be calculated from the addresses specified in the Address Group.

User may view the "Total" line on the AE4X46-503J Remote Display or the bottom border of the AEQuery program window to see the calculated totals appear at the specified interval.

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AE4X46-503J REMOTE DISPLAY

DESCRIPTION

The AE4X46-503J Series Remote Display displays Goal and Actual data sent from the AE44-503J. It includes four digit red displays for the Production Goal and a four digit green displays for the Production Actual Count of 11 different production lines, including the total of all 11 Goal and Actual counts. The Production Goal and Actual counts are updated every second via RS232 output from each of the AE44-503J displays. The Production Goal and Actual Total counts are updated at the specified interval (1-99 minutes) from the RS485 output of the PC, calculated by the AEQuery software. The digits are four inches high and are visible up to 200 feet away.

The model numbers of the AE4X46-503J Series are derived from the digit size and the number of columns and rows of displays of the overall display, followed by the suffix 503J. For example the AE4X46-503J is a Four Inch, Four-Digit display, Four Displays high, and Six Displays across. For two-sided versions, the model number would have /2. For example: AE4X46/2-503J would be the model number for a Two-Sided, Four Inch, Four Digit Four Displays high, Six Displays across Production Remote Display System. For your specific model number and hardware configuration refer to the drawings at the back of this manual.

The AE4X46-503J Series Remote Displays are factory configured with RS232 Input for computer and AE Device data acquisition.

SPECIFICATIONS

Enclosure:	Black Anodized Aluminium Enclosure with .118" thick Bronze lenses (non-glare) and 1/8" thick Black ABS back panels (3) 30.5" H x 48" L x 3.5" D Sections with 5" x 5" x 3" Plastic Boxes mounted on top and bottom each make up the entire Remote Display. The overall dimension = 40.5" H x 144" L x 3.5" D
Digits:	Four Inch High, Seven Segment Digits. Red dot LED's for the Goal and Green dot LED's for the Actual.
Number of Digits:	Four lines with Six displays per line and four digits per display. See the drawings at the back of this manual for your specific model.
Power:	120 VAC, 60 Hz (20VA). Eight-foot power cord is provided. Optional power includes 50 HZ, 12 VAC, 12 to 15 VDC and 220 VAC.
Signal Wiring:	All signal wiring is accessible at terminal blocks located inside the plastic conduit boxes on the top of the unit.
Power Wiring:	All power wiring is accessible at terminal blocks located inside the plastic conduit boxes on the bottom of the unit.
Count Input:	RS232 Input required from the (11) AE44-503J's. This allows the Production Goal and Actual data to be transmitted directly to the corresponding display line in the AE4X-46-503J.

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Totalized Input: AEquery software and an RS232/485 I/O Adapter (for RS232 Output Only, ATS P/N: 9200-0509-A) are required for the Production Goal and Actual Totalized data to be transmitted to the total line in the AE4X46-503J via RS232.

INSTALLATION

MOUNTING

The AE4X46-503J Remote Display is provided with mounting brackets at specified points on the enclosure. See drawings at the back of this manual for further detail.

WIRING

All power wiring (120VAC) may be accessed in the plastic conduit box on the bottom of each section of the display.

All signal wiring may be accessed in the plastic conduit box on the top of each display. Each display line requires a "COM" and "RCV" wire connection from terminals 12 and 13 of TB1 in the AE44-503J units. The #1,2,3,4 AE44-503J Displays RS232 output must be wired to the box labeled "Units 1-4". Likewise the #5,6,7,8 AE44-503J Displays RS232 output must be wired to the box labeled "Units 5-8". Then the #9,10,11 AE44-503J Displays RS232 output must be wired to the box labeled "Units 9-11,TOT". The RS232 output from the RS485/232 adapter (RS232 Output Only, ATS P/N: 9200-0509-A) must be wired to the "Total RCV" and "Total COM" in the box labeled "Units 9-11,TOT". See the picture below of the wiring boxes (with covers removed) mounted the first four lines of the Remote Display.



AE44-503J WITH OPTION 230J INSTALLED

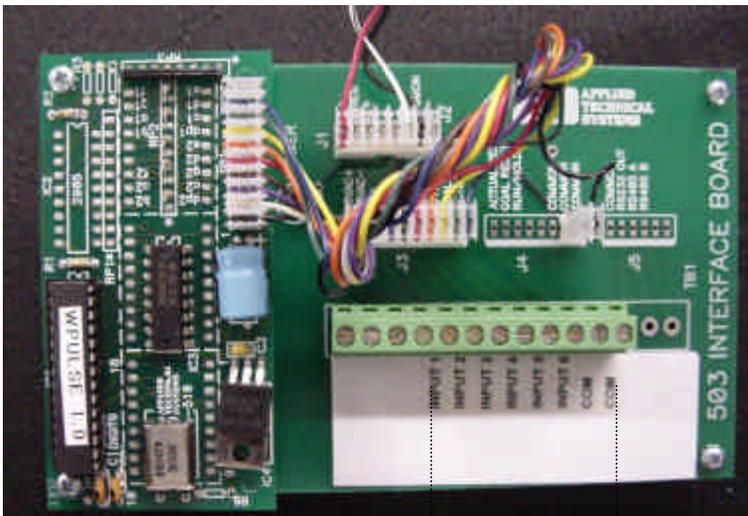
SIX-INPUT SUMMING EVENT COUNTER

DESCRIPTION

This Option (AE-OPT-230J) can be added to any AE Series Display to provide six channels of inputs (usually push button switches) allowing up to six work stations to totalize their production count on a single display. The AE-230J is an external module for interfacing to other counters such as the AEXX-230, AEXX-483, and AEXX-503 Series Displays.

SPECIFICATIONS:

Provides up to six simultaneous dry contact inputs
Count Rate: Up to 2 pulses per second (2Hz) per input.
Count Signal: Dry contact closure only (>20 msec duration.) Internally pulled up to 5VDC.
Reset Signal: Dry contact closure only (>20 msec duration.) Internally pulled up to 5VDC. Reset from 503J Interface board terminal block or from front panel "Actual Reset" Push-button.



INSTALLATION:

Typical wiring: Each input requires a dry contact and is clearly labeled on the terminal block. See the above diagram for a typical connection to a push-button switch.

OPERATION

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Before applying power, be sure all wiring is completed. Apply power to the unit. A version number will appear for a few seconds and then the counter will display all zeros. If a charged battery is installed, the self-test will be bypassed.

The six COUNT signals must be dry contacts from momentary switches or relays. The count will be incremented by one count with a contact closure from any of the six inputs. For example, if all six inputs occur at the same time the counter will go up by six counts.

The count will continue up to the maximum count allowed by the number of digits in the display. For example: 999999 for a six digit display. The next pulse will cause the count to roll over to zero and the pulses will continue to increment the count.

The RESET signal must also be a dry contact from a momentary switch or relay. The count will be reset to zero when the contact closure is applied.

The RESET signal overrides the COUNT signal. As long as the RESET signal is applied, the COUNT signals are ignored.

If power is lost, a rechargeable battery backup system will store the count for up to four hours. Also the RESET signal is functional during power loss.

TECHNICAL SUPPORT

For any questions concerning installation and operation of this product, contact our factory at:

**PHONE (800) 444-7161
OR
FAX (318) 797-4864**

SERVICE POLICY

It is recommended that all service for this product be done by the factory or by a factory authorized service representative. Applied Technical Systems will provide ongoing service support in and out of warranty. Send your repairs to:

**APPLIED TECHNICAL SYSTEMS
849 KING PLACE
SHREVEPORT, LA 71115**

**APPLIED TECHNICAL SYSTEMS
WARRANTY POLICY**

ATS warrants its products to be free of defects in material and workmanship for a period of 24 months from the date of purchase. ATS will repair or replace any product returned to its authorized factory service center within the warranty period so long as there is no evidence that the product has been abused, misused, damaged by lightning, overloads of any kind or water, or altered in any way.

Products returned for warranty must be returned with freight prepaid. ATS will pay normal freight charges to return the product to the customer. Special premium freight requested by the customer will be charged to the customer.

ATS disclaims any warranties expressed or implied, including merchantability and/or fitness for a particular purpose. In no event shall ATS be held liable for incidental or consequential damages.