



990 STARTER

OPERATION & PARTS



ARROW
ENGINE COMPANY

 a TRIMAS company



In 1955 Arrow Engine Company opened for business, beginning the tradition of providing premium service and exceptional products to the oil & gas industry, as well as the industrial engine market, throughout the world.

Arrow Engine Company is part of the TriMas Corporation. TriMas consists of 11 business units with 2007 revenues of \$1 billion and maintains a workforce of over 5,000 people at 80 different facilities in 10 countries around the world.

With a consistent focus on our customers' needs, striving to help them grow their business, and producing the most reliable equipment and parts in the industry, Arrow has forged a 54 year tradition of excellence.

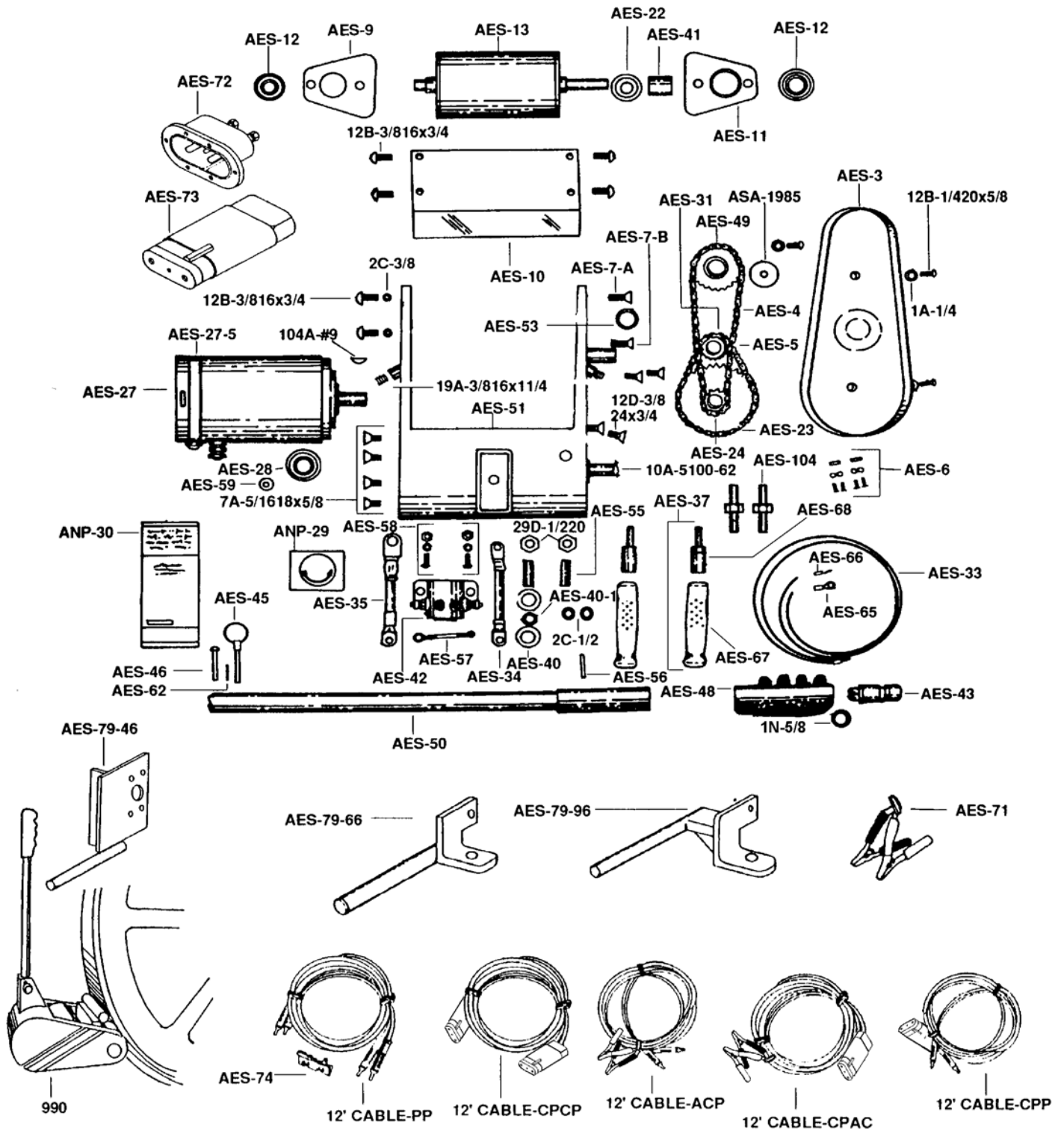


990 Arrow Engine Starter

- **Arrow torque 12-volt motor with extra heavy duty winding & armature with anti-friction ball bearings**
- **Heavy duty construction equipment starter button**
- **Sealed permanent lube ball bearings, throughout**
- **High performance special composition roller**
- **Plug-in-type high amp capacity connectors**
- **New larger capacity safety clutch**
- **Lightweight - portable - 43 lbs.**
- **Safe single hand operation**



Arrow Portable Electric Starter (990 Starter)



Arrow Portable Electric Starter (990 Starter)

Arrow Part No.	Description	Quantity
1A-1/4	Plated Lockwasher	5
1N-1/4	Washer Flat SAE	2
1N-5/8	Wahser Flat SAE	1
2C-3/8	Internal Lockwasher	2
2C-1/2	Internal Lockwasher	2
7A-5/1618x5/8	Capscrew Hex Hd	4
10A-5100-62	Ext Retaining Ring	1
12B-1/420x5/8	Capscrew Button Head	5
12B-3/816x3/4	Capscrew Button Head	2
12D-3/824x3/4	Mach. Screw Flat Soc	4
29A-1/420	Finished Hex Nut	2
29D-1/220	Finished Hex Jam Nut	5
104A-#9	Woodruff Key	1
AES-3	Chain Drive Cover	1
AES-4	Chain-60 #35 PTCH	1
AES-5	Roller Chain-Short	1
AES-6	35-1 Chain Conn Link	2
AES-7-A	Capscrew-Sm Hd	1
AES-7-B	Capscrew-Lg Hd	1
AES-9	Alum Brg Housing w/Brg	1
AES-10	Pivot Bracket	1
AES-11	Alum Brg Housing w/Brg	1
AES-12	Bearing	2
AES-13	Strt Friciton Roller	1
AES-22	Sproket Spacer	1
AES-23	Dbl Sprkt w/Bushing	1
AES-24	Dbl Sprkt Bushing	1
AES-27	Electric Motor 12VDC	1
AES-27-5	Motor Brush Cover	1
AES-28	Bearing	1
AES-30	Motor-Brushes-Set	1
AES-31	Sprocket-Motor	1
AES-33	Starter Btn Wire	2
AES-34	Cable-Mtr-Solenoid	1
AES-35	Cable-Sol to Recep	1
AES-40	Insulated Washer	2
AES-40-1	1/2" Insulator	1
AES-41	Clutch Plate	1
AES-42	Solenoid	1
AES-43	Starter Btn	1

Continued

Arrow Portable Electric Starter (990 Starter)

Arrow Part No.	Description	Quantity
AES-45	Lock Pin	1
AES-46	Pin Handle Rivet	1
AES-48	Grip Cover	1
AES-49	Rlr Dr w/Clutch	1
AES-50	Starter Handle Assy	1
AES-51	Frame	1
AES-53	Clutch	1
AES-55	Receptacle Brass	2
AES-56	Pin Handle Grip Sleeve	1
AES-57	Solenoid Wire	1
AES-58	Screw, Nut & Washer	2
AES-59	Grommet for Starter	1
AES-62	Retainer Pin	1
AES-65	Large Hole Eyelet	1
AES-66	Small Hole Eyelet	1
AES-67	Starter Cable Grips	2
AES-68	Starter Cable Plugs	2
ASA-1985	Check Valve Disc Pltd.	1
ANP-29	Rotation Decal	1
ANP-30	Warning Release Roller	1
ACCESSORIES:		
12' Cable-ACP	Allig. Clips & Plugs	1
16' Cable-ACP	Allig. Clips & Plugs	1
20' Cable-ACP	Allig. Clips & Plugs	1
12' Cable-CPAC	Cannon Plugs, Allig, Clips	1
16' Cable-CPAC	Cannon Plugs, Allig, Clips	1
20' Cable-CPAC	Cannon Plugs, Allig, Clips	1
12' Cable-CPCP	Cannon Plug Both Ends	1
16' Cable-CPCP	Cannon Plug Both Ends	1
20' Cable-CPCP	Cannon Plug Both Ends	1
12' Cable-PP	Plugs w/Female Recep	1
16' Cable-PP	Plugs w/Female Recep	1
20' Cable-PP	Plugs w/Female Recep	1
*Custom Length Cables Also Available		
*All Cables Made w/ #4 Welding Cable		
AES-37	Male Plug w/Insulator Kit	1
AES-71	Alligator Clips-Pair	1
AES-72	Cannon Receptacle	1
AES-72-RK	Cannon Recep. Repair Kit	1
AES-73	Cannon Plug Assy	1
AES-73-RK	Cannon Plug Recep. Kit	1
AES-74	Recep Mounting Bracket	1
AES-79-46	Starter Bracket	1
AES-79-66	Starter Bracket	1
AES-79-96	Starter Bracket	2
AES-104	Adapter Plug	1

Operation and Installation Instructions



Figure 1

Figure 1 shows a typical mounting bracket permanently placed on the engine or engine base. The mounting bracket or pin should be approximately 11" long and 3/4" in diameter. The pin should extend parallel to the axis of the flywheel and approximately 1" perpendicular distance from the surface on the outside diameter of the flywheel. This will allow for maximum single hand leverage of the

roller against the engine flywheel. Due to the various types of bases used on engines we do not furnish the mounting pin; it is normally furnished by the welder or installer, in the field. All current Arrow engines are equipped with starter brackets.



Figure 3

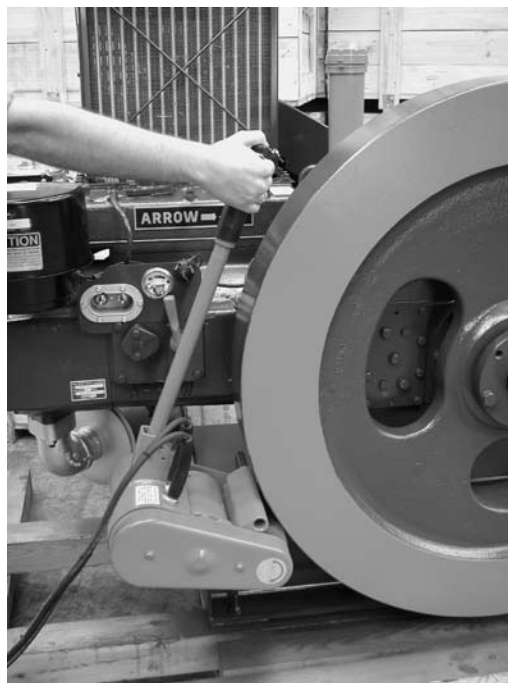
Figures 2 & 3 show the Arrow Engine Starter installed complete with the standard 12-foot No. 4 cables plugged into the vehicles power supply.

Safety Clutch will prevent the engine flywheel from transmitting excessive RPM to the starter motor armature. Failure to release the roller immediately can result in serious damage to the motor armature windings without the Safety Clutch.



Figure 2

The new model 990 Arrow Engine Starter is equipped with a new, large size, built-in automatic Safety Clutch. If the operator does not release the roller from the flywheel immediately after the engine starts operating, the



ARROW MANUFACTURED
**REPLACEMENT
PARTS**

Caterpillar® Engines

G379 G3304
G398 G3306
 G399

Ford® Engines

300 Industrial Engine
Governor

Waukesha® Engines

F2895 P9390
F3521 145G/F817
F5108 140G/F554
L5790 WAK/1197
 L7042

Gemini® Engines

G26 G40
Compressor Parts

Fairbanks® Engines

ZC-118 ZC-503
ZC-208 ZC-739
 ZC-346

Ajax® Engines

5 x 6½
EA-22, 6½ x 8 CMA
EA-30, 7¼ x 8 CMA
E-30, 7½ x 10 CMA
E-42, 8½ x 10 CMA
DP-60, 9½ x 10 CMA
DP-70/80/160, 11 x 14 CMA
DP-115/230, 13¼ x 16

Piston & Rod Assemblies

180
360
600
800

Arrow Engine Company is in no way associated with Caterpillar®, Ford®, Fairbanks®, Ajax®, Gemini® or Waukesha®. All manufacturers' names and descriptions are for reference only.

OEM

C-Series

*C-46 *C-96
*C-66 *C-106
*C-255

VR-Series

VR-155 VR-310
VR-220 *VR-330
VR-232 *VR-330CF
*VR-260 VR-265
VR-283 *VR-380

A-Series

*A42 *A54 *A62

***K6 Slow Speed Engine**

Lufkin Engines

L-333 L-1770
*L-795 L-2165

Witte Engines

98 E15 F32
B12 E20 F42

Arrow Chemical Pumps

*10 Series (beam operated)
*12 & 13 Series (pneumatic)
*430 Series (electric)
*500 & 510 Series (pneumatic)
*Solar Chempump

***VRC-2 Gas Compressor**

Gas Products

*Volume Tanks
*Vertical & Horizontal Separators
*Suction Scrubbers
*Meter Runs
*Coalscers
*Skids



ARROW ENGINE COMPANY

2301 East Independence
Tulsa, Oklahoma 74110

toll free 800 331-3662

local 918 583-5711

toll free fax in US & Canada 800 266-1481

fax 918 388-3202

www.arrowengine.com

copyright Arrow Engine

* Products currently manufactured by Arrow Engine Company & owned as OEM