



# Design Concepts

Eaton's Carter brand Model 60427 underwing nozzle is utilized world-wide by more companies and at more airports than any other nozzle. Tens of thousands have been produced for the industry since its introduction in 1970. Although designed for commercial application, it has been widely used by the military, especially in pantograph hot refueling operations. It is of modular design with various swivel disconnects, hose end control valves (HECVs) and other options available to tailor the nozzle to a customer's specific requirements. Eaton's Carter brand Model 60427 is a family of nozzles building upon the base unit to achieve the desired end product.

## Features

- Lightweight and rugged
- Connects to 3-lug international standard aircraft adapter
- Self-adjusting pressure loaded nose seal
- No mechanical adjustments or springs used. Leak free under extreme side loads, worn adapters and extreme temperatures
- Nose seal can be changed with minimum of disassembly (optional)
- Lead-in ramps of stainless steel for longer life

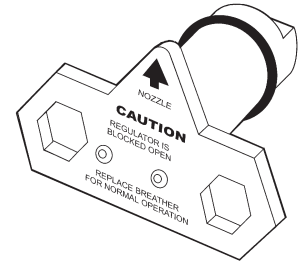
- Operating handle fully protected from damage
- Bicycle-type handles with replaceable grips standard for ease of operation and low cost replacement
- Two threaded ports in nozzle body allow simultaneous vacuum breaker and product sampling fitting installation
- Modular construction — easy to customize to specific requirements
- 2, 2-½ & 3 inch NPT & BSP threaded quick disconnect (QD) inlets available
- Optional 60 & 100-mesh screens retained with snap ring for ease of removal
- 35, 45 & 55 psi (2.413, 3.103 & 3.792 bar) hose end control valves available
- Choice of new ball valve or dry break disconnect for easy strainer inspection available
- Bonding cable, vacuum breaker & 6 inch longer handles optional
- Low pressure drop

## Special Tools

Certain special tools are recommended for the maintenance of Eaton's Carter brand Model 60427 nozzle (see following descriptions).

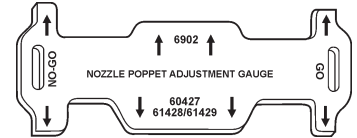
## Model 61656 Blockout Device

Model 61656 blockout device is recommended for use when one defuels through a hose end regulator or it is necessary to check out the secondary pressure control device in a system. It does not introduce fuel into the ambient port of the regulator which can later become a dangerous spray during operation.



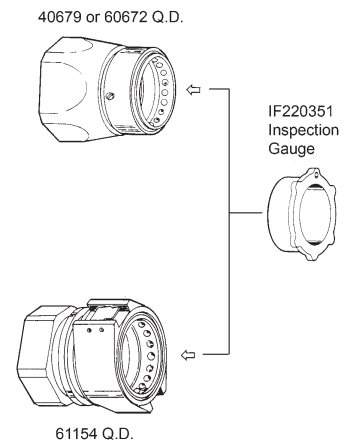
## Model 64000 Poppet Adjustment Gauge

This simple inexpensive gauge provides an accurate method of achieving the proper adjustment of the poppet of the Model 60427 nozzle. The gauge can be used on all of Eaton's Carter brand underwing nozzles.



## Model IF220351 Inspection Gauge

The ball locking sleeve on the standard quick disconnect (QD) and the dry break disconnects will wear with age. Wear of the sleeve can cause the disconnect to accidentally separate resulting in a possible spill. Inspection gauge IF220351 is designed to determine the safe limits of the sleeve wear.



# Technical Data

## Hose End Control Valve

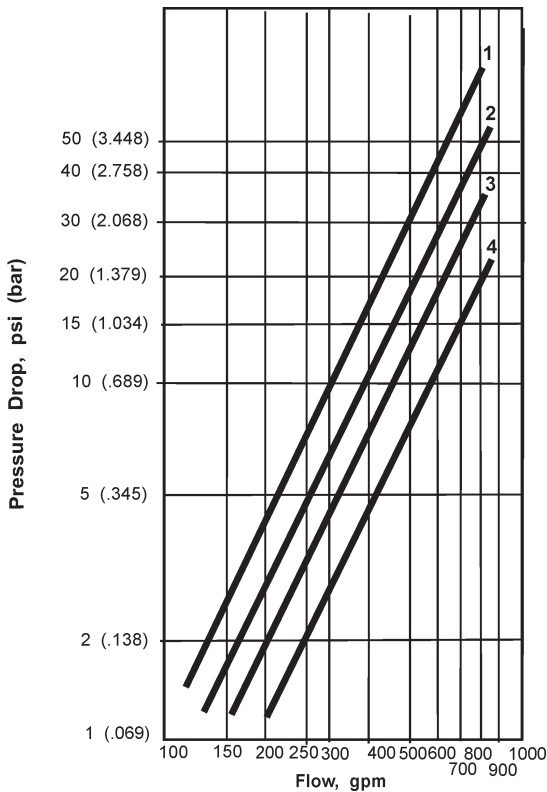
Eaton's Carter brand hose end control valves (HECVs) are designed to provide a maximum control pressure at its outlet (at the pressure sensing port of the nozzle). The control pressure is a function of the main spring that loads the poppet. In addition to limiting downstream pressure under flow conditions, the HECV is designed to limit surge pressures caused by aircraft (downstream) valve closures. Lockup pressure (downstream pressure trapped between a closed HECV and a closed downstream system) is also limited. The following characteristics are typical:

- Nominal spring settings 35 psi (2.413 bar), 45 psi (3.103 bar) & 55 psi (3.792 bar) available
- Surge pressure control 10 psi (.689 bar) maximum over spring setting, with 0.5 second downstream valve closure minimum

- Lock-up pressure — 10 psi (.689 bar) maximum over spring setting
- Pressure limitation — +5 psi (.345 bar) above spring setting with 90 psi (6.205 bar) inlet pressure for decreasing flow rates from 500 US gpm
- Hysteresis (difference in pressure control between increasing and decreasing flow rates) — control pressure with decreasing flow rates will normally be slightly greater than for increasing flow rates
- Defueling possible through unit, however block out device required to maintain maximum flow. Use Eaton's block out device Model 61656
- Model 61656 blockout device recommended if system secondary control valve is to be checked

## Flow Characteristics

Pressure drop curves including aircraft adapter



## Nozzle Model Number Conversion Table

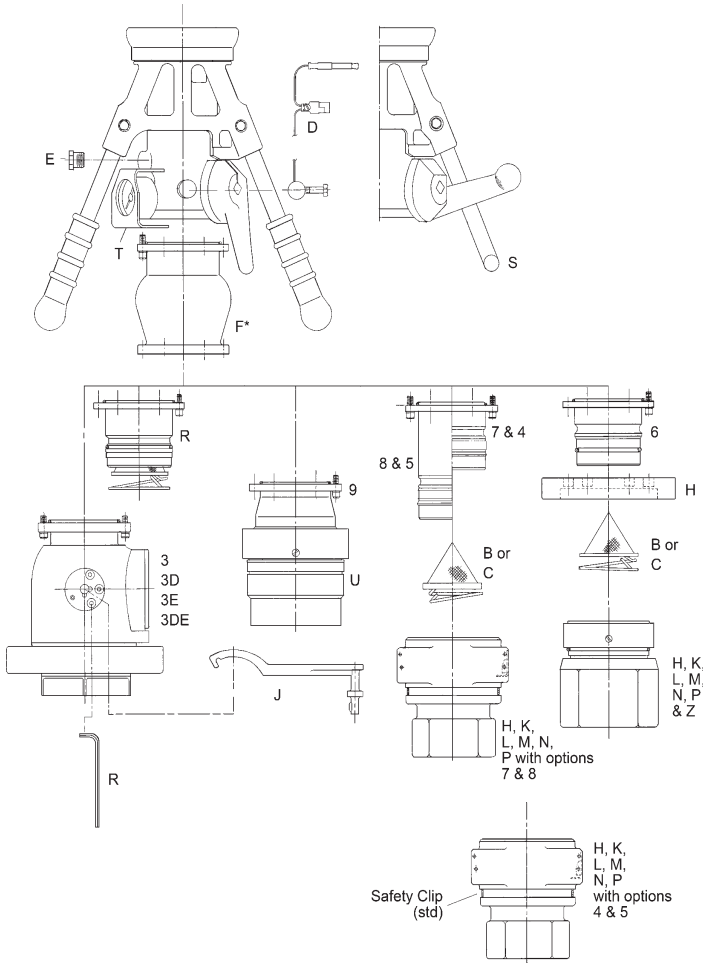
The following table offers equivalent Eaton Carter brand nozzle models for Whittaker units and are fully interchangeable with them:

Whittaker model	Eaton model
F116, F116N, F117	60427, 64348
F116A, F116AN, F117A	60427D, 64348D
F116B, F116BN, F117B	60427E, 64348E
F116G, F116GN, F117G	60427F4, 64348F4
F116H, F116HN, F117H	60427F3, 64348F3
F116P, F119NP, F117P	60427F5, 64348F5
F116ES	64349H
F116ER	64349J
F116T, F116NT, F117T	60427B, 64348B
F116U, F116NU, F117U	60427B, 64348B
F116V, F116NV, F117V	60427C, 64348C
F1163A, F116N3A, F1173A	604276H, 643486H
F1167A, F116N7A, F1177A	604276H, 643486H
F1163B, F116N3B, F1173B	60427K, 64348K
F1167B, F116N7B, F1177B	604276K, 643486K
F1163C, F116N3C, F1173C	604276L, 643486L
F1167C, F116N7C, F1177C	604276L, 643486L
F1163D, F116N3D, F1173D	604276P, 643486P
F1167D, F116N7D, F1177D	604276P, 643486P
F1163E, F116N3E, F1173E	604276M, 643486M
F1167E, F116N7E, F1177E	604276M, 643486M
F1164A, F116N4A, F1174A	604278H*, 643488H*
F1164B, F116N4B, F1174B	604278K*, 643488K*
F1164C, F116N4C, F1174C	604278L*, 643488L*
F1164D, F116N4D, F1174D	604278P*, 643488P*
F1164E, F116N4E, F1174E	604278M*, 643488M*
F1167b, F116N7b, F1177b	604276K, 643486K
F1163C, F116N3C, F1173C	604276L, 643486L
F1167C, F116N7C, F1177C	604276L, 643486L
F1163D, F116N3D, F1173D	604276P, 643486P
F1167D, F116N7D, F1177D	604276P, 643486P
F1163E, F116N3E, F1173E	604276M, 643486M
F1167E, F116N7E, F1177E	604276M, 643486M

\* If a hose end control valve is utilized (option F) then the "\*" should be replaced with a "7" in all cases.

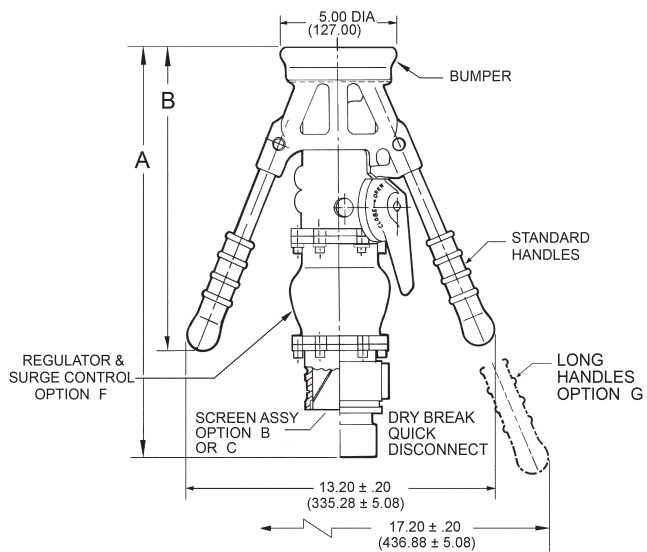
- Curve 1** Model 60427CF\*6H nozzle with 100-mesh screen, HECV & 2-½ inch inlet
- Curve 2** Model 60427C6H or C6K nozzle with 100-mesh screen & 2-½ inch inlet
- Curve 3** Model 60427F\*6H nozzle without screen, with HECV & 2-½ inch inlet
- Curve 4** Model 604276H or 6K nozzle without screen, with 2-½ inch inlet

# Illustrated Options



## Envelope Dimensions

Dimensions shown in inches (millimeters)



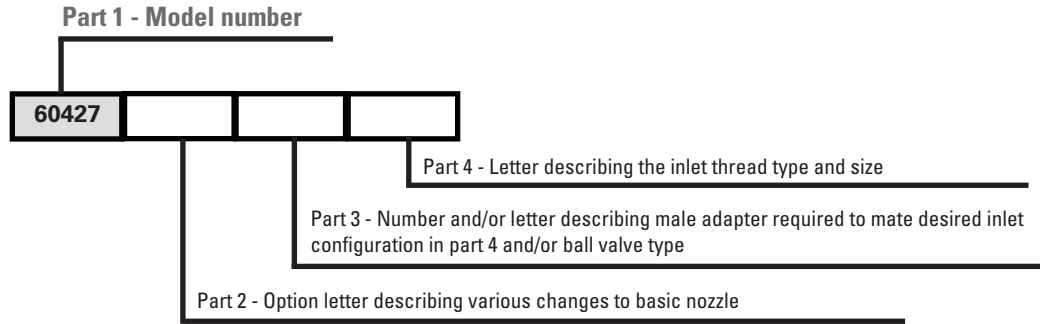
Options	Dimension "A"		Dimension "B"	
	inch	(mm)	in	(mm)
Basic	8.22	(208.79)	12.78	(324.61)
F*	12.44	(315.98)		
F*6H, F*6K, F*6N	16.54	(420.12)		
F*6, F*6R	15.14	(384.56)		
6H, 6K, 6N & 6P	12.32	(312.93)		
6 & R	10.92	(277.37)		
6L, 6M, 6Z	12.82	(325.63)		
4 & 7	10.88	(276.35)		
5 & 8	12.93	(328.42)		
G			17.88	(454.15)
F*4H, F*4K-N, F*4P,				
F*7H, F*7K-N, F*7P	18.12	(460.25)		
5H-5P, 8H-8P	16.21	(411.73)		
9U	14.05	(356.87)		
F*9V	18.27	(464.06)		
3H, 3K, 3N, 3P	16.20	(411.48)		

# Ordering Data

The part number of a complete nozzle consists of four basic parts as illustrated below.

## Part 1

Basic model number. Options from parts 2, 3 & 4 must be added to achieve a complete unit. Basic unit weight: 6.3 lbs (2.857 kg)



## Part 2

The following options may be added as part 2 of the part number as indicated above to order a unit to meet your requirement.

Option	Description	Weight lbs	kg	Option	Description	Weight lbs	kg
*B	Adds 60-mesh screen	+0.05	0.023	G	Adds 15 inch handles	+1.5	0.680
*C	Adds 100-mesh screen	+0.05	0.034	†H	Adds drag ring	+0.88	0.399
D	Adds bonding cable (44311)	+0.20	0.091	R	Adds flight refueling male disconnect	+1.8	0.816
E	Adds vacuum breaker (41599)	+0.10	0.399	S	Stirrup handle package added	+1.2	0.544
**F3	Adds 35 psi (2.413 bar) HECV	+2.25	0.453	T	Pressure gauge (no longer available)	-	-
**F4	Adds 45 psi (3.103 bar) HECV	+2.25	0.544	V	Deletes handles (nozzle w/o handles)	-1.0	-0.453
**F5	Adds 55 psi (3.792 bar) HECV	+2.25	0.635	Z	Arctic nose seal assembly temperatures -65°F (-53.88°C)	-	-

\* Options B & C only available when a male half or a ball valve from part 3 or option R is specified

\*\* To obtain a nozzle with two HECVs, specify two options in series, F5F4 results in 55 psi (3.792 bar) and 45 psi (3.103 bar) units with the 55 psi (3.792 bar) unit assembled as the one nearest the inlet. If two HECVs with different pressures are required the higher pressure unit should be specified first

† Option H can only be used with any option F

## Part 3

The configuration of the inlet is defined by adding the appropriate number or number and option letter from the table (right) in conjunction with the appropriate option letter from part 4 below. The nozzle may terminate in an adapter half only, if desired. In this case, leave part 4 blank. To obtain a female half, quick disconnect (QD) or dry break, or to complete the specification of the ball valve outlet, part 4 must be completed. Weights vary depending on inlet configuration selected in part 4.

Option	Description	Option	Description
3	Adds ball valve (64015). Select inlet configuration from part 4 to complete part number	5	Adds male adapter half to mate 64001 QD swivel when used without HECV (any F option) (44700)
D	Adds glass inspection port to option 3 ball valve	6	Adds male adapter half (43046) to mate std QD (43108) & old style dry break QD (60672-1)
E	Adds drag ring to option 3 ball valve	7	Adds male adapter half to mate 61154 dry break when HECV (any F option) is used (44185)
J	Adds long spanner handle for use with option 3 ball valve only. Order as part of each nozzle or see Model 64015 catalog sheet (TF100-88) to order separately	8	Adds male adapter half to mate 61154 dry break when used without HECV (any F option) (44700)
R	Adds defuel key for use with option 3 ball valve only. Order as a part of each nozzle or see Model 64015 catalog sheet (TF100-88) to order separately	9	Adds male adapter half to mate high flow female QD (includes 100-mesh screen). Only available as complete QD with 3 inch JIS inlet thread (42275-3). Specify with option U, part 4
4	Adds male adapter half to mate 64001 QD swivel when HECV is used (any F option) (44185)		

## Part 4

One of the following letters must be included as part 4 to specify the inlet thread size (leave blank except for option 9 in part 3 if male adapter only is desired):

Option	Description	Option	Description
H	Inlet thread — 2-½ inch NPT	N	Inlet thread — 2 inch BSPP
K	Inlet thread — 2-½ inch BSPP	P	Inlet thread — 2 inch NPT
L	Inlet thread — 3 inch NPT	U	Inlet thread — 3 inch JIS (only applicable with option 9, part 3)
M	Inlet thread — 3 inch BSPP (not available w/ option 3 ball valve)	Z	Inlet thread — 3 inch JIS (only applicable with option 6, part 3)

### Examples:

60427CD6H	Nozzle with 100-mesh screen, bonding cable and standard QD with 2-½ inch NPT inlet thread
60427BDE3DEJRP	Nozzle with 60-mesh screen, bonding cable, vacuum breaker, ball valve with glass inspection port, drag ring, operating spanner, defuel key and 2 inch NPT inlet thread
60427EF46	Nozzle with vacuum breaker, 45 psi (3.103 bar) HECV and male adapter to mate standard female QD

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