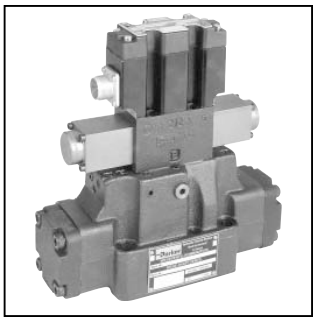
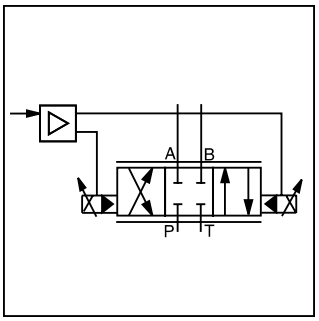
A

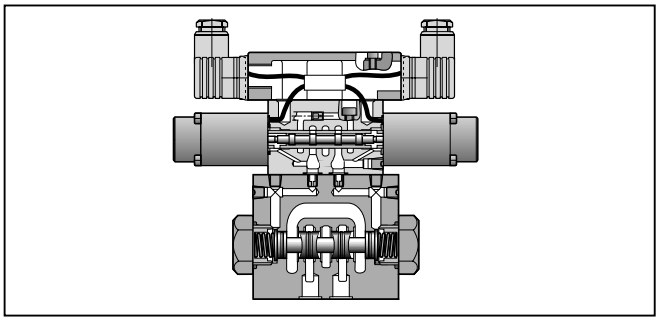
## General Description

Series D*1FW and D*1FT two-stage pilot operated proportional directional control solenoid valves are available with or without integrated control electronics. Valves are available in sizes NG10 (CETOP 5), NG16 (CETOP 7) and NG25 (CETOP 8).

Typical applications include reproducible control of actuator speed in rapid/slow speed profiling, and smooth acceleration and deceleration performance.





## Features

- Standard DIN/ISO/CETOP/NFPA interfaces.
- Optional integrated control electronics with ramp adjustment.
- Progressive flow characteristics for improved low flow resolution.
- Spring centered main stage spool.
- Wide selecton of spool options and flow capacity.
- 2:1 ratio spool options.

CE

## Specifications

| Interface DIN (NFPA/ISO/CETOP) | NG10 (5) | NG16 (7) | NG25 (8) |
|---|---|---|---|
| **Flow Rating** @10 Bar (150 PSI) Δp (P→A, B→T) (Spool options up to) LPM (GPM) | 75 (20) | 200 (53) | 400 (106) |
| **Pilot Flow** — Continuous LPM (GPM) | 1.2 (0.3) | 1.2 (0.3) | 1.2 (0.3) |
| **Step Response** (time to reach 90% of a 100% step command) ms | 60 | 75 | 100 |

| | | |
|---|---|---|
| **Hysteresis** | % | <5 |
| **Repeatability** | % | <2 |
| **Operating Pressure** | | |
| Port P, A, B | Bar (PSI) | 345 (5000) max. |
| Port P, internal pilot | | 20 (290) min. |
| Port T, internal drain | | 10 (150) max. |
| Port T, external drain | | 345 (5000) max. |
| Port Y, pilot drain | | 10 (150) max. |
| Port X, external pilot | | 20-345 (290-5000) |

| | |
|---|---|
| **Fluid Cleanliness Level** | ISO Class 16/13 |
| **Fluid Viscosity, Recommended** | 80 – 1000 SSU |
| **Fluid Temperature, Recommended** | 0°C to +60°C (+32°F to +140°F) |
| **Ambient Operating Temperature** | -20°C to +60°C (-4°F to +140°F) |

### Series D*1FT with integrated electronics

| | |
|---|---|
| **Supply Voltage** | 14.5 to 30 VDC |
| **Current** | 3 amps |
| **Command Signal** (impedance) (select by ordering code) | 0 ± 10 VDC (100K) 0 ± 20 mA (500 ohms) |
| **Command Polarity** | Pin 'D' more positive than 'E'; flow P to B |
| **Ramp Time Adjustment** | 0 to 3 seconds |
| **Environmental Protection Class** | NEMA 1 (IP54) |
| **Mating Connector** (order separately) (7-pin CE) | Part #5004072 |

### Series D*1FW without integrated electronics

| | |
|---|---|
| **Solenoid (order code "L")** | |
| Nominal Resistance | 2.2 ohms |
| Nominal Current | 2.5 amps |
| Nominal Voltage | 6 volts |
| **Solenoid (order code "X")**[1] | |
| Nominal Resistance | 9.8 ohms |
| Nominal Current | 1.3 amps |
| Nominal Voltage | 16 volts |
| **Environmental Protection Class** | NEMA 1 (IP54) |
| **Mating Connectors Solenoid (DIN 43650)** | Part # 692914 (black) Part # 692915 (gray) |

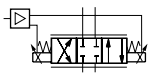
1) For use with 24 volt based electronic driver cards.

A

| D | | 1 | F | T | | | C | | | | | 0 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Directional Control Valve | Size and Interface | Pilot Operated | Flow Control | Integrated Electronics | Spool Type | Flow | Style | Pilot Connection | Seal | Electronic Variation | Electronic Accessories | Valve Accessories | Design Series |

NOTE: Not required when ordering.

| Code | Description |
|---|---|
| 3 | NG10/CETOP 5 |
| 4 | NG16/CETOP 7 |
| 9 | NG25/CETOP 8 |

| Code | Style |
|---|---|
| C |  |

| Code | Description |
|---|---|
| N | Nitrile |
| V | Fluorocarbon |

| Code | Description |
|---|---|
| 0 | Standard, no accessories |
| 2 | Pilot Pressure Reducer (2) |

(2) Recommended for pilot pressure applications > 205 Bar (3000 PSI)

| Code | Pilot | Drain |
|---|---|---|
| 1 | Internal | External |
| 2 | External | External |
| 4 | Internal | Internal |
| 5 | External | Internal |

| Code | Description |
|---|---|
| F | Voltage Input 0... ±10V (with reference output +10V/-10V) |
| G | Current Input 0... ±20mA |

**Sine Spool Options - Spool Type and Flow Codes**

| Code | | Sine |
|---|---|---|
| $Q_A=Q_B$ | $Q_A>Q_B$ [1] | Spool Type |
| E01 | B31 |  |
| E02 | B32 |  |

| Code | Flow at Δp 5 Bar (72.5 PSI) per metering edge | | |
|---|---|---|---|
| | D31 LPM (GPM) | D41 LPM (GPM) | D91 LPM (GPM) |
| C | 75 (20) | – | – |
| F | – | 200 (53) | – |
| H | – | – | 400 (106) |

**V-Notch Spool Options - Spool Type and Flow Codes**

| Code | | V-Notch |
|---|---|---|
| $Q_A=Q_B$ | $Q_A>Q_B$ [1] | Spool Type |
| E21 | B41 |  |
| E22 | B42 |  |

| Code | Flow at Δp 5 Bar (72.5 PSI) per metering edge | | |
|---|---|---|---|
| | D31 LPM (GPM) | D41 LPM (GPM) | D91 LPM (GPM) |
| B | – | – | – |
| D | – | 120 (32) | – |
| F | – | – | 300 (79) |

1) Reduced Flow Rate on Port B, Nominal Flow Rate on Port A
Code A* for spool $Q_B>Q_A$ optional

**Weight:**

| | |
|---|---|
| NG10 | 7.1 kg (16.0 lbs.) |
| NG16 | 10.8 kg (23.8 lbs.) |
| NG25 | 19.0 kg (42.0 lbs.) |

Mating connector not included in delivery.

## Accessories

Refer to the Accessories section for bolt kits, subplates, connectors and pre-assembled cable assemblies.

## Mounting Interface

Refer to Mounting Interface Dimensions in the Proportional Directional Valve Section of this catalog.

| D | | 1 | F | W | | | C | | | | W | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Directional Control Valve | Size and Interface | Pilot Operated | Flow Control | Open Loop | Spool Type | Flow | Style | Pilot Connection | Seal | Solenoid Voltage | Solenoid Variation | Valve Accessories | Design Series |

NOTE: Not required when ordering.

| Code | Description |
|---|---|
| 3 | NG10/CETOP 5 |
| 4 | NG16/CETOP 7 |
| 9 | NG25/CETOP 8 |

| Code | Style |
|---|---|
| C |  |

| Code | Description |
|---|---|
| L[2)] | 6 VDC/2.5A |
| X | 16 VDC/1.3A |

2) Standard

| Code | Description |
|---|---|
| N | Nitrile |
| V | Fluorocarbon |

| Code | Description |
|---|---|
| 0 | Standard, no accessories |
| 2 | Pilot Pressure Reducer [(3)] |

(3) Recommended for pilot pressure applications > 205 Bar (3000 PSI)

| Code | Pilot | Drain |
|---|---|---|
| 1 | Internal | External |
| 2 | External | External |
| 4 | Internal | Internal |
| 5 | External | Internal |

| Code | Description |
|---|---|
| W | Socket Connector DIN 43650 without Plugs |

**Sine Spool Options - Spool Type and Flow Codes**

| Code | | Sine Spool Type |
|---|---|---|
| $Q_A=Q_B$ | $Q_A>Q_B$ [1)] | |
| E01 | B31 |  |
| E02 | B32 |  |

| Code | Flow at Δp 5 Bar (72.5 PSI) per metering edge | | |
|---|---|---|---|
| | D31 LPM (GPM) | D41 LPM (GPM) | D91 LPM (GPM) |
| C | 75 (20) | – | – |
| F | – | 200 (53) | – |
| H | – | – | 400 (106) |

**V-Notch Spool Options - Spool Type and Flow Codes**

| Code | | V-Notch Spool Type |
|---|---|---|
| $Q_A=Q_B$ | $Q_A>Q_B$ [1)] | |
| E21 | B41 |  |
| E22 | B42 |  |

| Code | Flow at Δp 5 Bar (72.5 PSI) per metering edge | | |
|---|---|---|---|
| | D31 LPM (GPM) | D41 LPM (GPM) | D91 LPM (GPM) |
| B | – | – | – |
| D | – | 120 (32) | – |
| F | – | – | 300 (79) |

1) Reduced Flow Rate on Port B, Nominal Flow Rate on Port A
Code A* for spool $Q_B>Q_A$ optional

**Weight:**

| | |
|---|---|
| NG10 | 7.1 kg (16.0 lbs.) |
| NG16 | 10.8 kg (25.0 lbs.) |
| NG25 | 19.0 kg (42.0 lbs.) |

## Accessories

Refer to the Accessories section for bolt kits, subplates, connectors and pre-assembled cable assemblies.

## Driver Cards

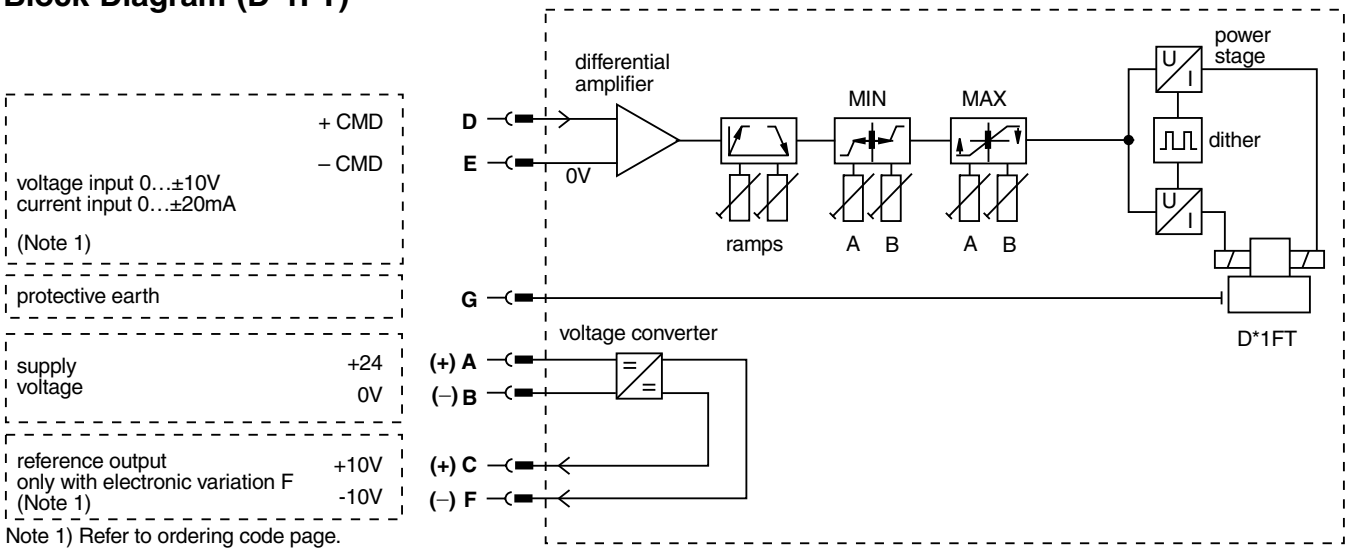
Refer to the Electronics section for driver cards and support electronics.

## Mounting Interface

Refer to Mounting Interface Dimensions in the Proportional Directional Valve Section of this catalog.

A

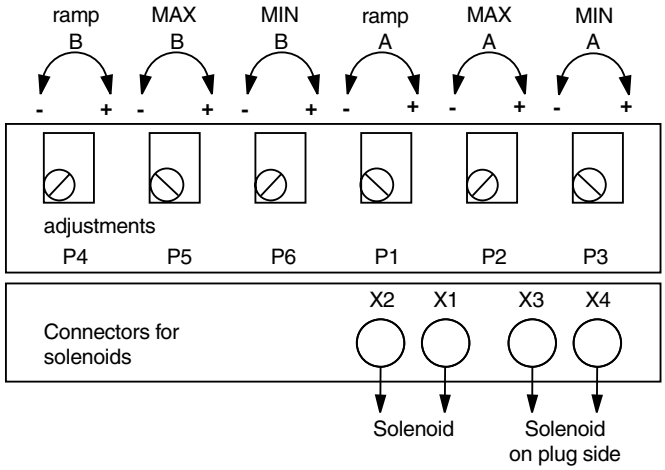
## Block Diagram (D*1FT)




Note 1) Refer to ordering code page.

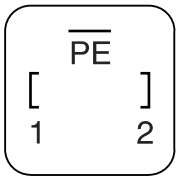
## Integrated Control Electronics (D*1FT)

### Arrangement of Potentiometers




## Wiring D*1FW — Solenoid Coil

(without integrated electronics)

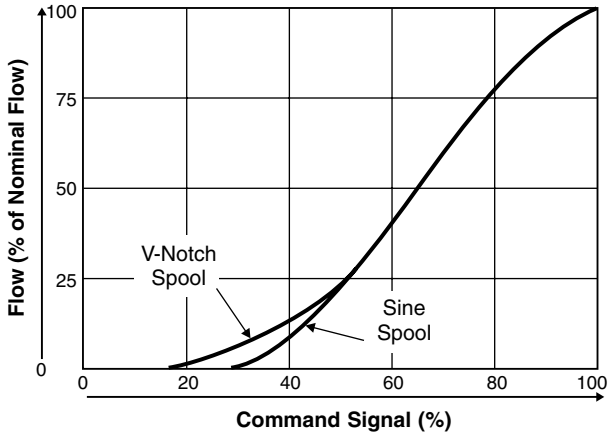



1 = coil connection
2 = coil connection
PE = ground potential

## Performance Curves

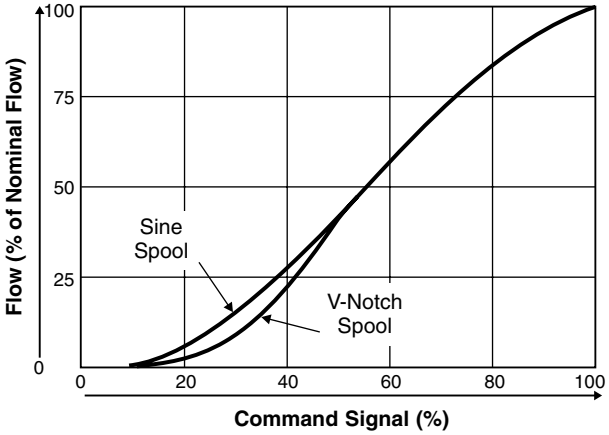
### D*1FW Flow Characteristics

at Δp = 5 Bar (72.5 PSI) / metering edge




### D*1FT Flow Characteristics (with integrated control electronics)

at Δp = 5 Bar (72.5 PSI) / metering edge




D_1FW-D_1FT.p65, dd

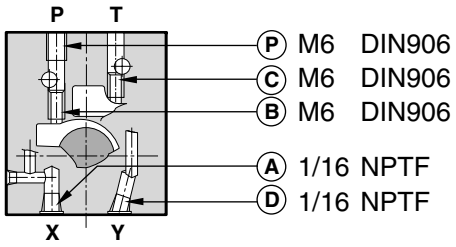


**Parker Hannifin Corporation**
Hydraulic Valve Division
Elyria, Ohio, USA

A

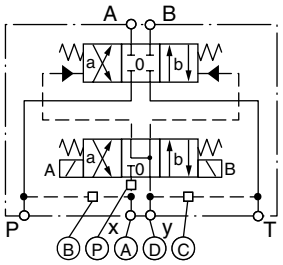
## Pilot Connection

### D31F*

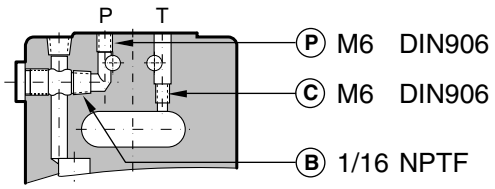



○ **open,** ● **closed**

| Pilot oil Inlet | Pilot oil Drain | A | B | C | D |
|---|---|---|---|---|---|
| internal | external | ● | ○ | ● | ○ |
| external | external | ○ | ● | ● | ○ |
| internal | internal | ● | ○ | ○ | ● |
| external | internal | ○ | ● | ○ | ● |

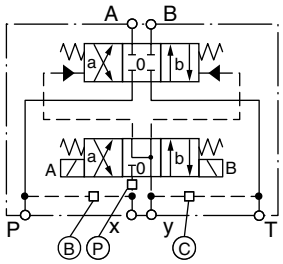



### D41F*

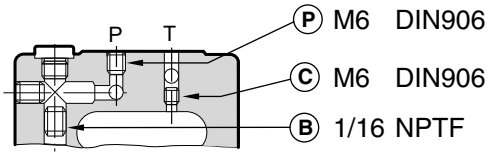



○ open, ● closed

| Pilot oil Inlet | Pilot oil Drain | B | C |
|---|---|---|---|
| internal | external | ○ | ● |
| external | external | ● | ● |
| internal | internal | ○ | ○ |
| external | internal | ● | ○ |

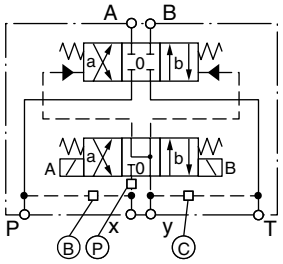



### D91F*




○ open, ● closed

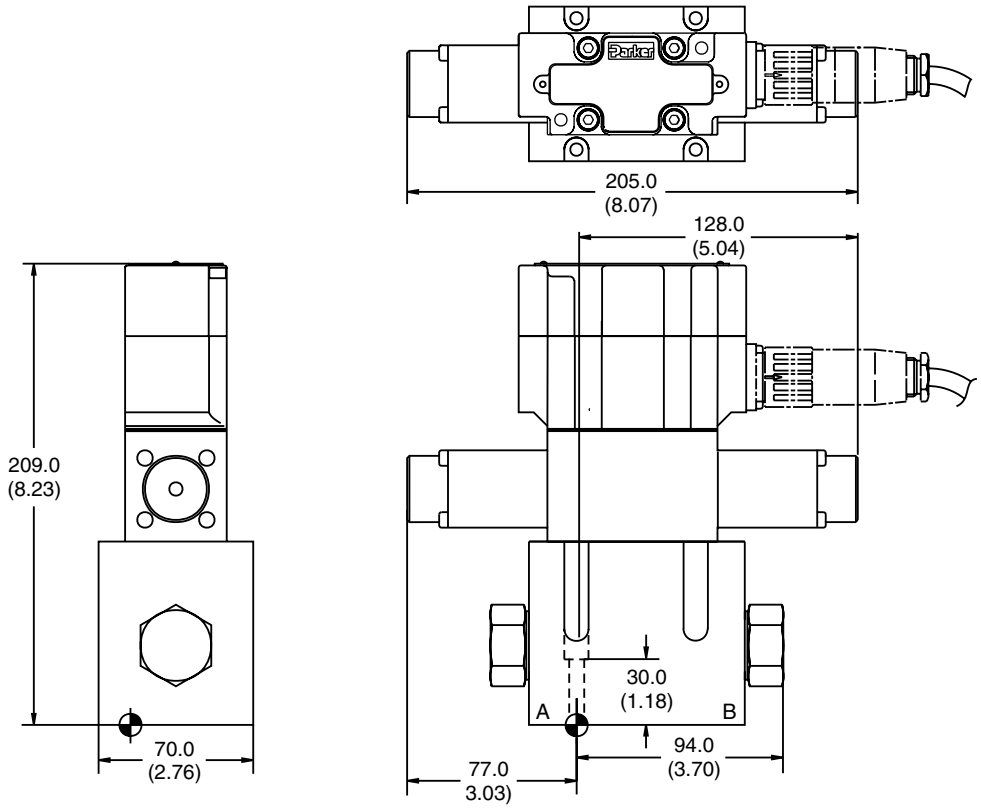
| Pilot oil Inlet | Pilot oil Drain | B | C |
|---|---|---|---|
| internal | external | ○ | ● |
| external | external | ● | ● |
| internal | internal | ○ | ○ |
| external | internal | ● | ○ |



A

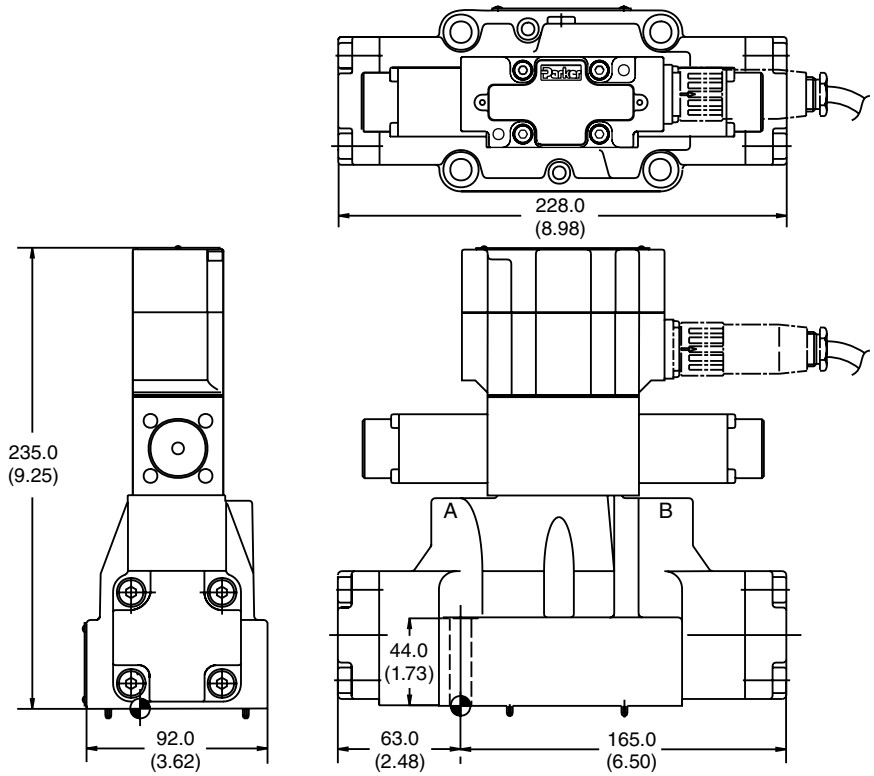
## D31FT

Inch equivalents for millimeter dimensions are shown in (**)




## D41FT

Inch equivalents for millimeter dimensions are shown in (**)




D_1FW-D_1FT.p65, dd

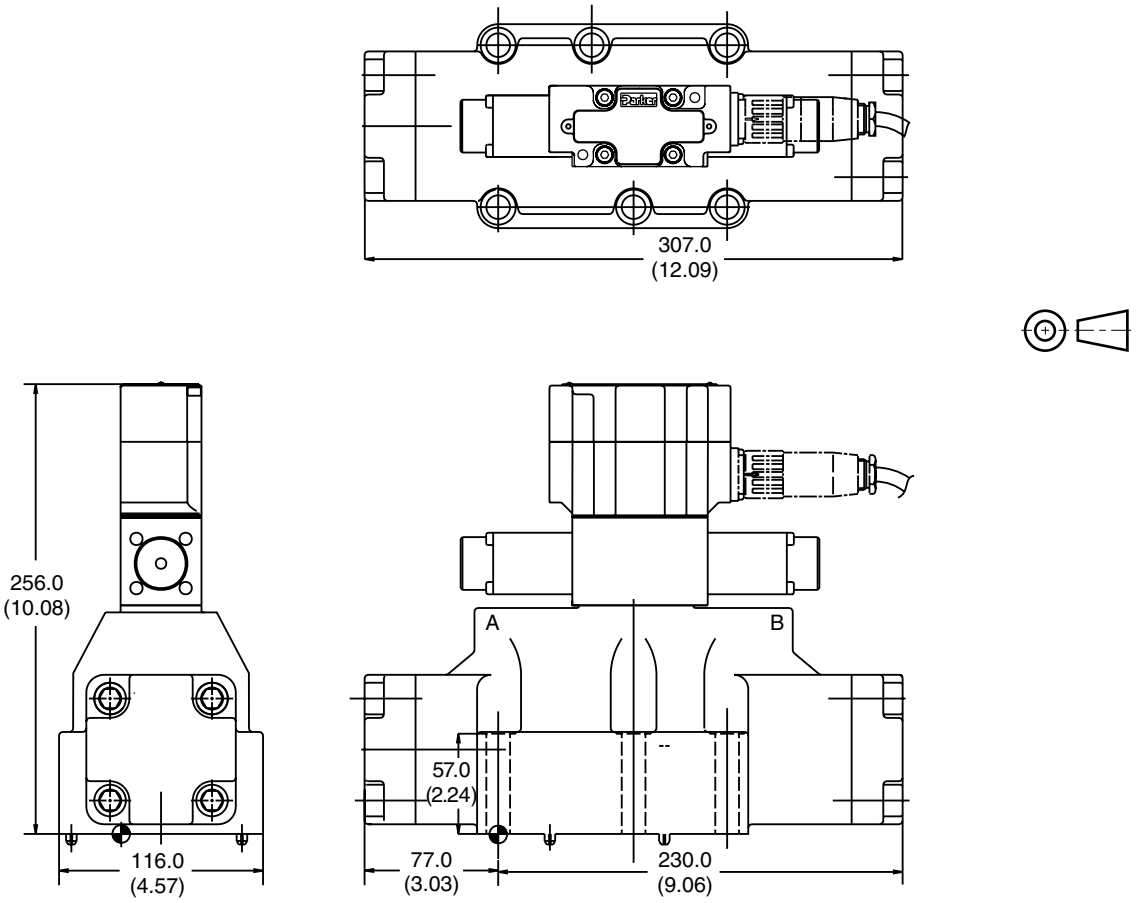


**Parker Hannifin Corporation**
Hydraulic Valve Division
Elyria, Ohio, USA

A

## D91FT

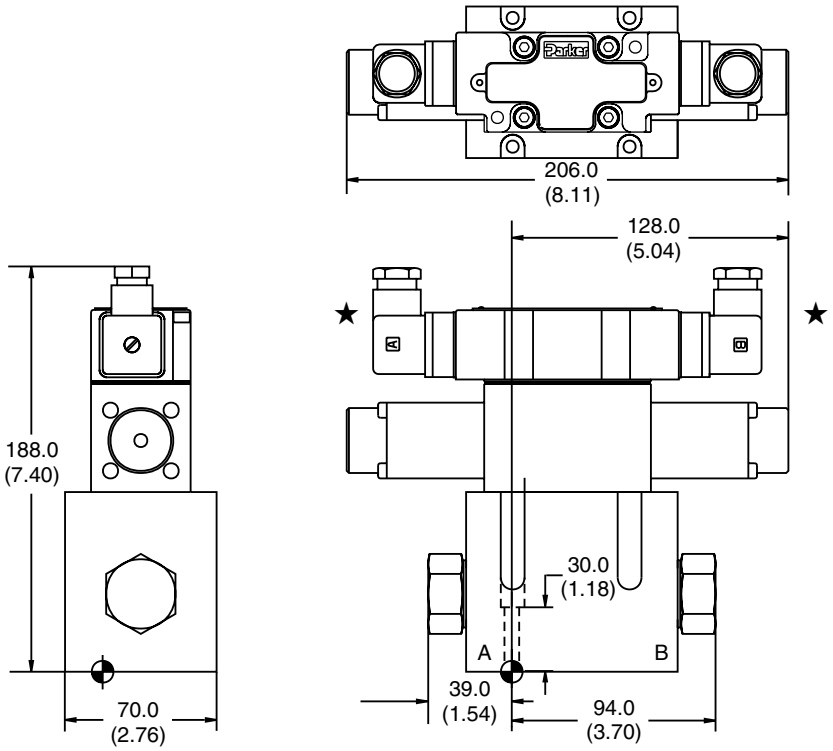
Inch equivalents for millimeter dimensions are shown in (**)



A

## D31FW

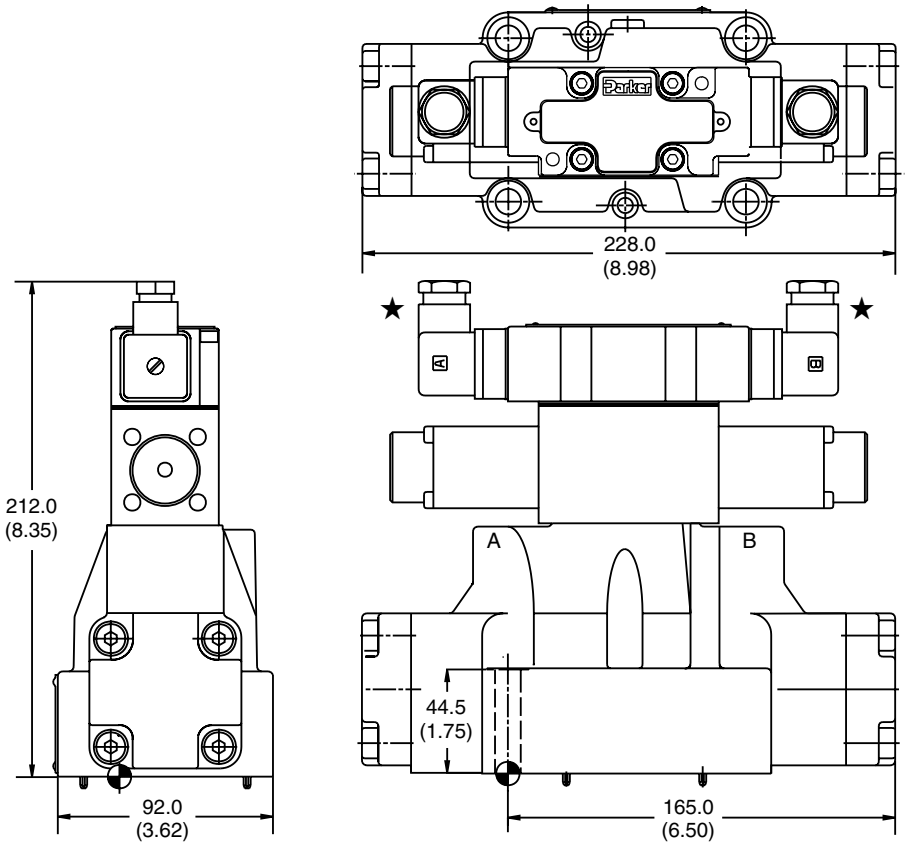
Inch equivalents for millimeter dimensions are shown in (**)




★ Order plugs separately.

## D41FW

Inch equivalents for millimeter dimensions are shown in (**)

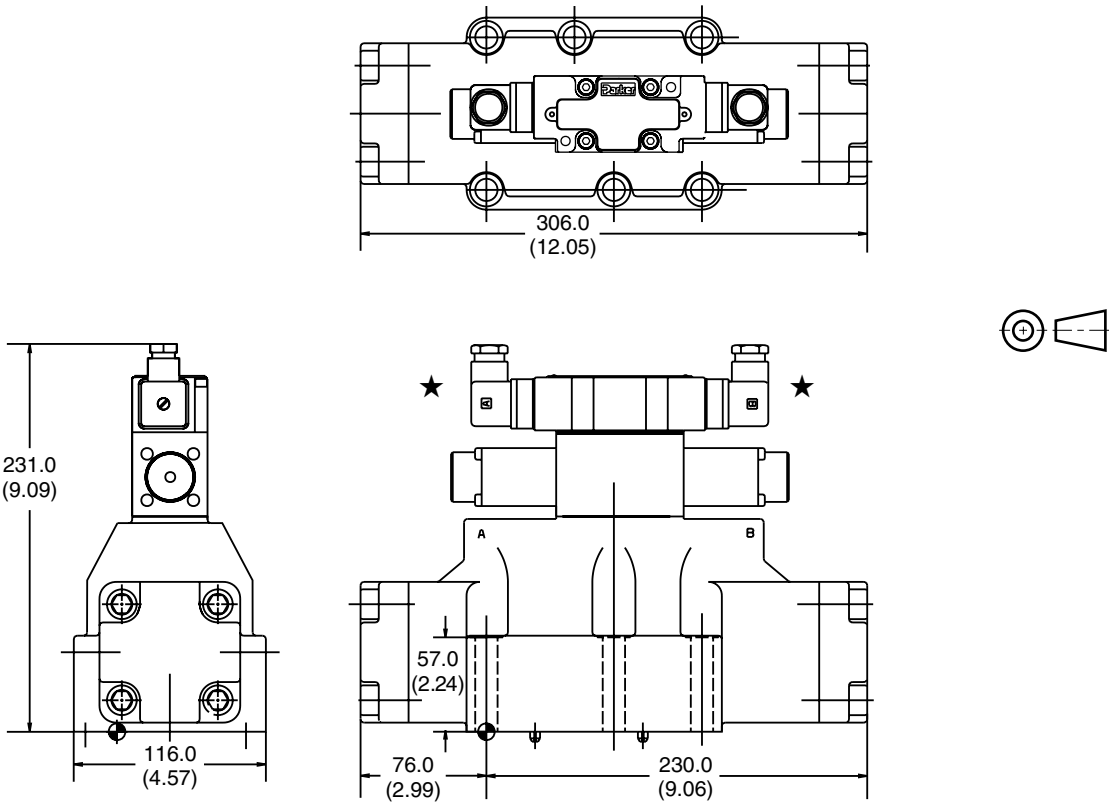



D_1FW-D_1FT.p65, dd

A

## D91FW

Inch equivalents for millimeter dimensions are shown in (**)




★ Order plugs separately.