

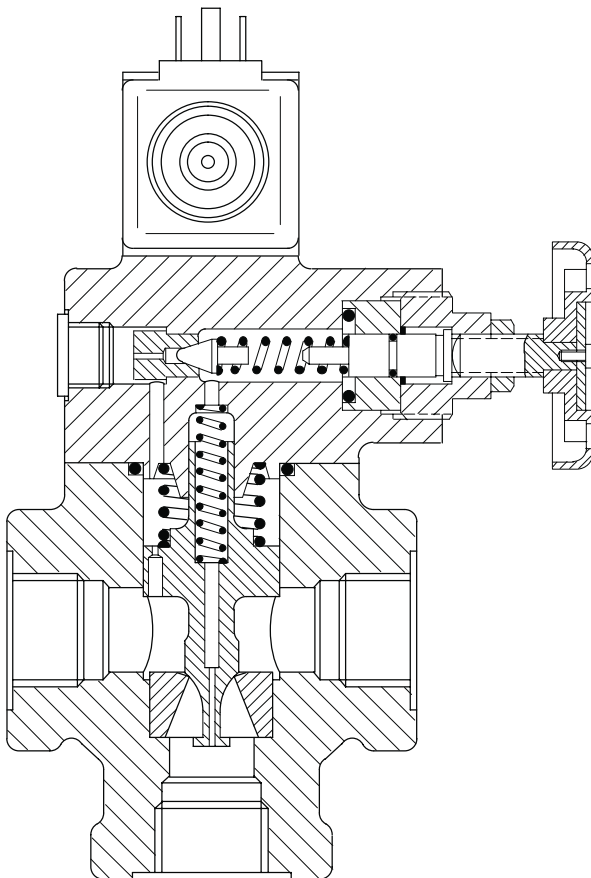


Pressure Relief Valves for Pipe Mounting

ECT-06/10, 10 Series; ECT5-06/10, 30 Series

Typical Section

ECT5-10 example



Basic Characteristics

Max. pressure 250 bar (3625 psi)

Max. flow rates:

ECT(5)-06 200 L/min (757 US gpm)

ECT(5)-10 . . . 380 L/min (1440 US gpm)

General Description

These adjustable pressure relief valves limit system pressure by directing pump flow to reservoir when the system pressure reaches the setting of the valve, thus preventing overloading the system. Their two-stage design ensures fast response and minimal pressure override. In addition to the conventional relief valve operation, a pilot venting feature allows the system pressure to be dropped to near-zero, or to a low-level pressure.

The valve is available in two versions: type ECT5, with integral solenoid operated pilot valve, and in basic form, type ECT.

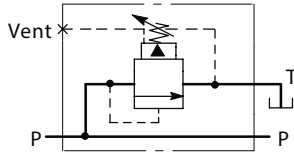
In the "ECT5" version, the pilot valve provides for selection of up to three pressures or one/two pressures plus off-loading according to the model type. The circuitry options can be further extended by the use of remote control valves.

In both the "ECT" and "ECT5" versions the "Vent" port can be connected to an on/off valve for load/unload, or to a pressure pilot valve for remote control of the pressure setting.

For both models the integral manual pressure adjustment is available as screw/locknut, or micrometer with keylock.

Functional Symbols

ECT valves

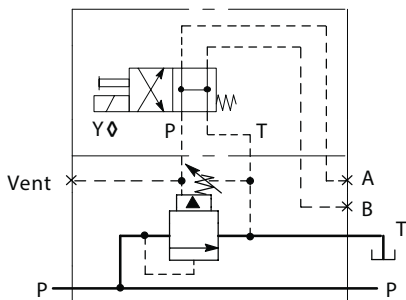


Notes:

1. All valves: Vent port fitted with removable plug.
2. ECT5 models: A and B ports fitted with removable plugs.
3. ECT5 models: Each valve carries two nameplates:
The mainstage valve carries the lower half of the functional symbol and shows the full valve model code.
The solenoid pilot valve carries the upper part of the functional symbol and shows the model code of the individual pilot valve.

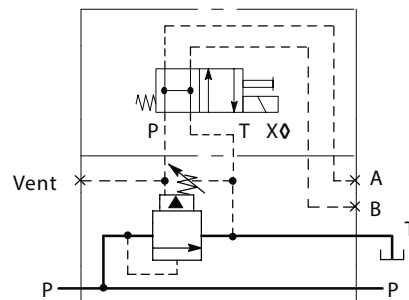
ECT5-***(V)-0B

Solenoid de-energized = Vented
Solenoid energized = On-load, by integral control



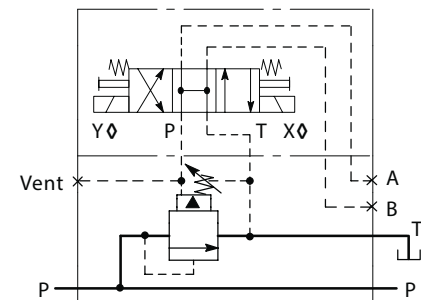
ECT5-***(V)-0BL

Solenoid de-energized = Vented
Solenoid energized = On-load, by integral control



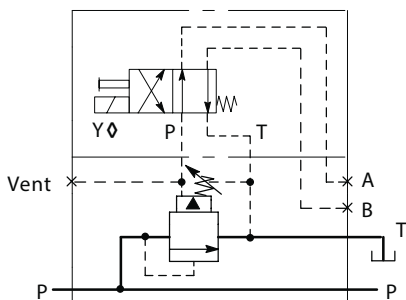
ECT5-***(V)-0C

Both solenoids de-energized = Vented
Right-hand solenoid $\diamond$ energized = On-load, externally controlled at A
Left-hand solenoid $\diamond$ energized = On-load, externally controlled at B



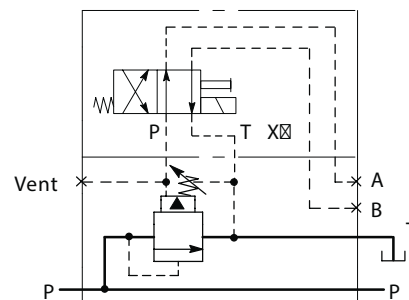
ECT5-***(V)-2A

Solenoid de-energized = On-load, externally controlled at A (or integral control if A plugged)
Solenoid energized = On-load, externally controlled at B (or integral control if B plugged)



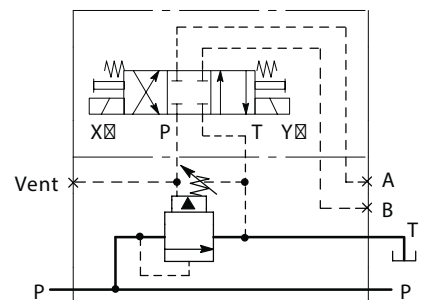
ECT5-***(V)-2AL

Solenoid de-energized = On-load, externally controlled at B (or integral control if B plugged)
Solenoid energized = On-load, externally controlled at A (or integral control if A plugged)



ECT5-***(V)-2C

Both solenoids de-energized = On-load, by integral control
Right-hand solenoid $\diamond$ energized = On-load, externally controlled at A
Left-hand solenoid $\diamond$ energized = On-load, externally controlled at B

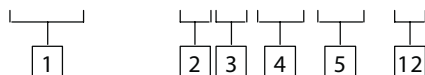


Model Codes

Features in brackets () may be omitted if not required. All other features must be specified.

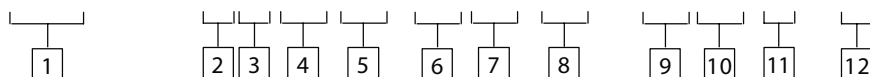
Basic Models (Without Integral Solenoid Pilot Valve)

(F3-)ECT- ** * (V)(-K) -1* TB



Models With Integral Solenoid Pilot Valve

(F3-)ECT5- ** * (V)(-K) - *** (-*)-(V)M- *** (L)- * 5-3* TB



1 Fluid compatibility

Blank = Anti-wear hydraulic oil
(class L-HM), invert emulsion
(class L-HFB) or water glycol
(class L-HFC)
F3 = As above or phosphate
ester (class L-HFD)

2 Nominal bore size

06 = $\frac{3}{4}$
10 = $1\frac{1}{4}$

3 Pressure adjustment range

B = 5 to 70 bar (75 to 1000 psi)
C = 35 to 140 bar (500 to 2000 psi)
F = 100 to 250 bar (1450 to 3625 psi)

4 High vent spring

Omit for low vent spring

5 Pressure adjustment method

K = Micrometer with keylock
Omit for screw/locknut method

6 Integral pilot valve spool/ spring arrangement

OB
OBL
OC
2A
2AL
2C
See "Functional Symbols"

7 Manual override options

Override option in solenoid end(s) only
Blank = Plain manual override
H = Water-resistant override on DC
solenoids only
Z = No override

8 Solenoid identity method

V = Solenoid "A" at port A end of pilot
valve; solenoid "B" at B end of
pilot valve (German practice).
Omit for solenoid identity to USA ANSI
B93.9 standard, i.e. energize solenoid
"A" for P to A; solenoid "B" for P to B.

9 Solenoid connection type ♦

U = ISO 4400 (DIN 43650) on coil ±
FW = $\frac{1}{2}$ NPT thread conduit box
FTW = $\frac{1}{2}$ NPT thread conduit box and
terminal strip
FJ = M20 thread conduit box
FTJ = M20 thread conduit box and
terminal strip
♦ Other connection types as shown in
catalog 2015 (DG4V-3/3S) may be made
available depending on quantities.
± Female connector to be supplied by user.

10 Indicator lights

Option for solenoid connection types
F(T)W and F(T)J
L = Lights fitted
Omit if lights not required. For U type
coil use plug with integral light, see nine
pages on.

11 Coil rating

A = 110V AC
BA = 110V AC 50 Hz/120V AC 60 Hz
C = 220V AC 50 Hz
DA = 220V AC 50 Hz/240V AC 60 Hz
G = 12V DC
H = 24V DC
Δ For 60 Hz or dual frequency.

12 Design number

10 series for ECT models
30 series for ECT5 models
Subject to change. Installation
dimensions unaltered for design
numbers 10-19 and 30-39 respectively.

Operating Data

Typical with petroleum oil at 21 °C (102 °F) and at 50 °C (122 °F).

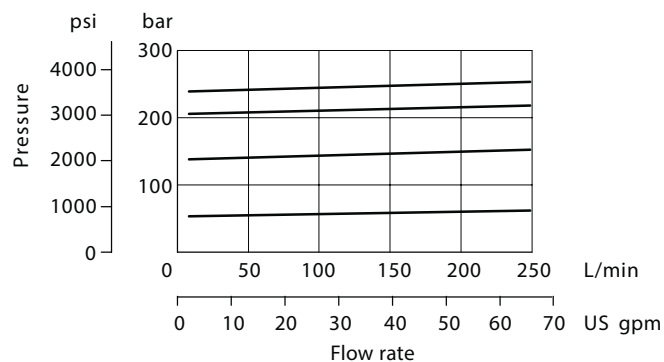
Maximum pressures: Ports P, A, B and Vent Port T Δ: ECT, 10 series ECT5, 30 series Δ Normally this is connected directly to the reservoir. Back pressure at port T is additive to the valve setting: if the back pressure exceeds system pressure by approx. 7 bar (100 psi), reverse flow T to P may occur.	250 bar (3625 psi) 250 bar (3625 psi) 100 bar (1450 psi) ECT5, 30 series valves are designed to satisfy the needs of most applications. Consult your Vickers representative about an alternative model if: a) Valves are required to remain pressurized for long periods without frequent switching, and/or b) Back pressure at port T is required to rise above 100 bar (1450 psi).																
Pressure adjustment ranges	See "Model Code" 3																
Maximum flow rates: ECT(5)-06 ECT(5)-10	200 L/min (757 US gpm) 380 L/min (1440 US gpm)																
Pressure override	See next page																
Vent pressures	See next page																
Vent flow	See next page																
Response times, ECT5 models	See two pages on																
Tank port leakage with valve closed. Valve set at max. pressure; pressure at port P = 50% of max. pressure. ECT(5)-**B ECT(5)-**C ECT(5)-**F	<200 cm³/min (12.2 in³/min) <300 cm³/min (18.3 in³/min) <500 cm³/min (30.5 in³/min)																
Thermal stability	See two pages on																
Electrical Data for ECT5 Models																	
Coil voltages	See "Model Code" 11																
Permissible voltage fluctuation: Maximum Minimum	See "Temperature Limits", three pages on 90% of rated voltage, see "Model Code" 11																
Relative duty factor	Continuous, ED = 100%																
Types of protection: ISO 4400 coils with plug fitted correctly Conduit box Coil winding Lead wires (coils type F**) Coil encapsulation	IEC 144, class IP65 IEC 144, class IP65 Class H Class H Class F																
Power consumption for coils listed in "Model Code" 11 :	<table> <tr> <th>Initial† VA (rms)</th><th>Holding VA (rms)</th></tr> <tr> <td>AC coils:</td><td></td></tr> <tr> <td>Types A, C at 50 Hz</td><td>225 39</td></tr> <tr> <td>Types B, D at 50 Hz</td><td>265 49</td></tr> <tr> <td>Types B, D at 60 Hz</td><td>260 48</td></tr> <tr> <td>DC coils:</td><td></td></tr> <tr> <td>G</td><td>30W –</td></tr> <tr> <td>H</td><td>30W –</td></tr> </table>	Initial† VA (rms)	Holding VA (rms)	AC coils:		Types A, C at 50 Hz	225 39	Types B, D at 50 Hz	265 49	Types B, D at 60 Hz	260 48	DC coils:		G	30W –	H	30W –
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Types B, D at 60 Hz	260 48																
DC coils:																	
G	30W –																
H	30W –																
	† 1st half cycle; solenoid armature fully retracted																

Performance Characteristics

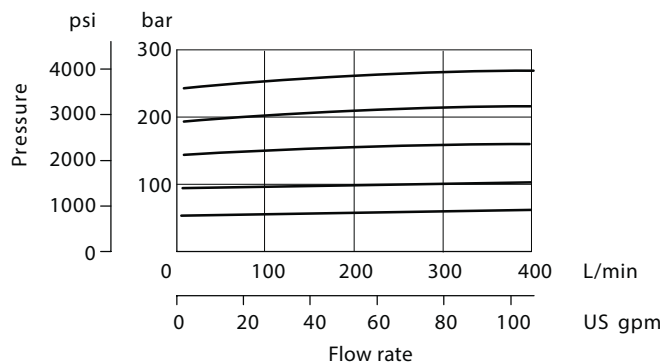
Typical with petroleum oil at 21 cSt (102 SUS) and at 50°C (122°F) unless stated otherwise.

Pressure Override at various settings

ECT(5)-06 models

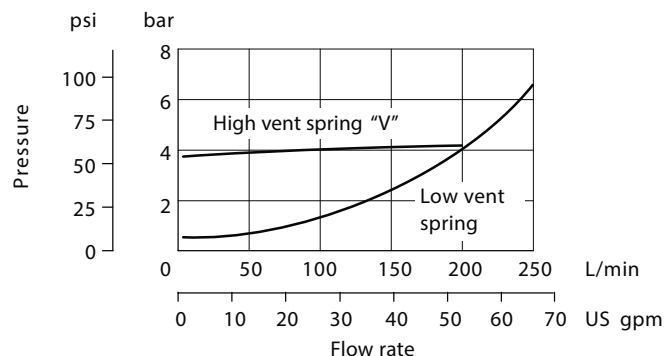


ECT(5)-10 models

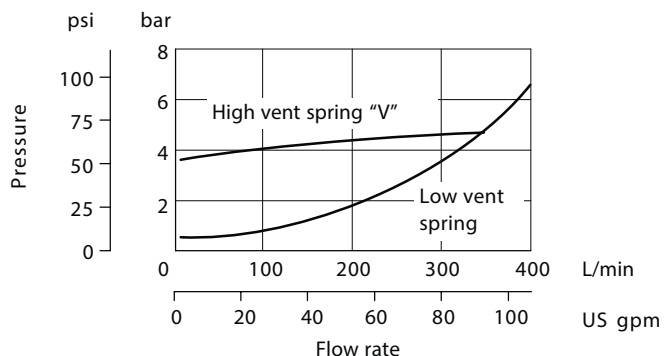


Vent Pressure Levels

ECT(5)-06 models

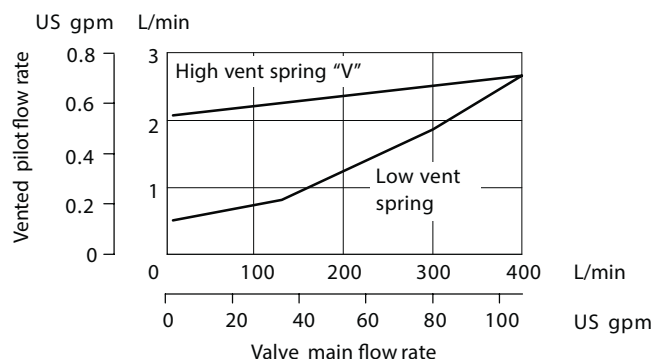


ECT(5)-10 models



Vent Flow/Main Flow

Valid for ECT(5)-06 and -10 models

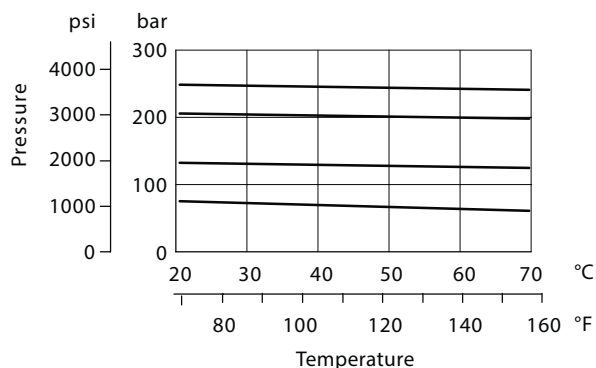


Thermal Stability

At various pressure settings and with flows:

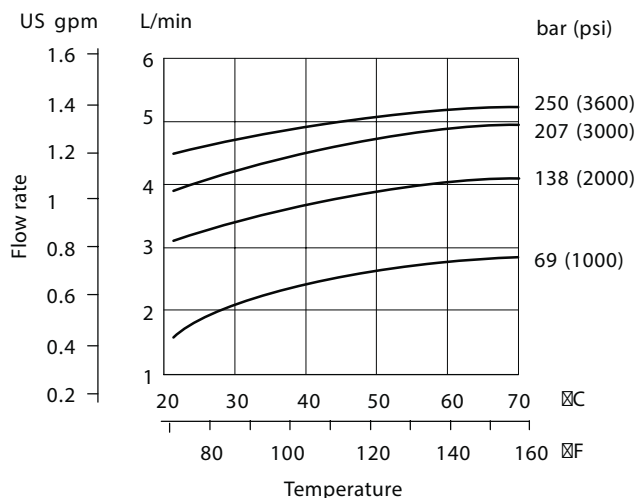
ECT(5)-06 at 150 L/min (40 US gpm)

ECT(5)-10 at 300 L/min (80 US gpm)

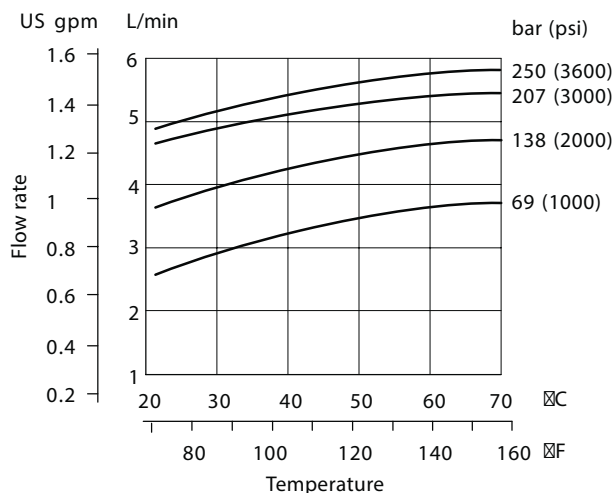


Under remote control conditions, vent line flow through pilot relief valve set at various pressures; main valves at maximum flow rates

ECT(5)-*** low vent pressure models



ECT(5)-***V high vent pressure models



Response Times, ECT5 Models

Approximate times for selecting remote and integral pressure settings from when a signal is first applied at the solenoid of an ECT5-***(V)-2** model.

AC solenoids:

Energizing 25 ms

De-energizing 20 ms

DC solenoids:

Energizing 50 ms

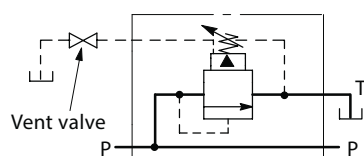
De-energizing 25 ms

♦ In pure switched circuit conditions devoid of the effects of any suppression diodes and full-wave rectifiers.

ECT5-***(V)-0** models (see "Functional Symbols") are slower when closing from the vented condition, ECT5-***V (high vent spring) models being faster than those without the "V" feature.

Control Methods

1. Manual adjustment of pressure setting
For details see "Installation Dimensions" section.
2. Vent connection
This connection allows a control valve to be placed in parallel with the pilot pressure stage of the valve. A suitable on/off valve can then be used to drop the system pressure to near-zero (or to the high vent pressure level), see diagram.



3. Remote control
Alternatively a pilot relief valve can be connected in place of or after the on/off valve, to provide remote control of the ECT(5) pressure setting. Suitable pilot relief valves are Vickers models C-175 and CGR-02, described in catalogs 411 and 409 respectively.

For ECT5 models, control circuitry options can be extended by additional valves connected to ports A and B.

Hydraulic Fluids

All valves can be used with:
Antiwear hydraulic oils (class L-HM)
Invert emulsions (class L-HFB)
Water glycol (class L-HFC)
Phosphate ester (class L-HFD), adding "F3-" prefix at model code 1.

The extreme viscosity range is from 500 to 13 cSt (2270 to 70 SUS) but the recommended range is 54 to 13 cSt (245 to 70 SUS).

For further information about fluids see leaflet 920.

Temperature Limits

Minimum ambient -20°C (-4°F)

Maximum ambient:

For ECT valves 70°C (158°F)

For ECT5 valves with coils listed in model code 11 and at 110% of rated voltage:

Coil type and frequency	Max. ambient temperature
Dual frequency coils	
Types B and D at 50 Hz	65°C (150°F)
Types B and D at 60 Hz	65°C (150°F)
Single frequency (50 Hz) coils	
Types A and C at 50 Hz	65°C (150°F)
DC coils	
Types G and H	70°C (158°F)

Fluid Temperatures (all Models)

	Petroleum oil	Water-containing
Min.	-20°C (-4°F)	+10°C (50°F)
Max.*	+70°C (158°F)	+54°C (130°F)

* To obtain optimum service life from both fluid and hydraulic system, 65°C (150°F) normally is the maximum temperature except for water-containing fluids.

For synthetic fluids consult fluid manufacturer or Vickers representative where limits are outside those of petroleum oil.

Whatever the actual temperature range, ensure that viscosities stay within the limits specified in the "Hydraulic Fluids" section.

Contamination Control Requirements

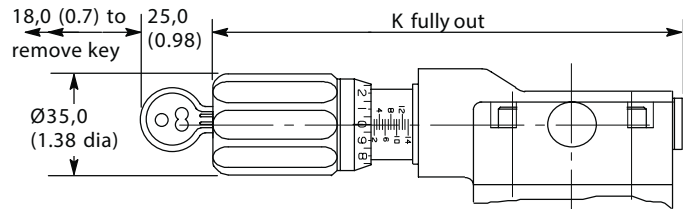
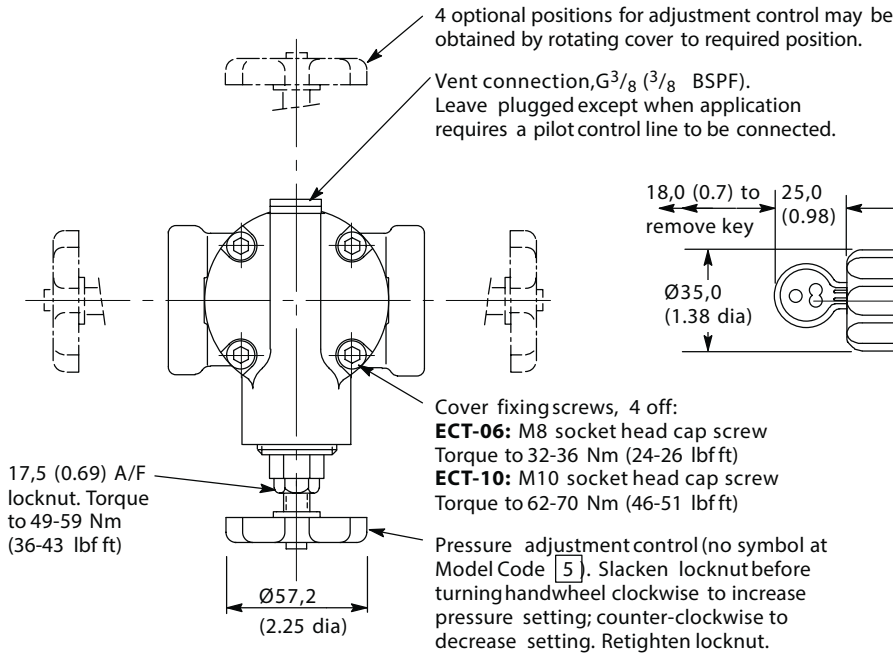
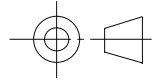
Recommendations on contamination control methods and the selection of products to control fluid condition are included in Vickers publication 9132 or 561, "Vickers Guide to Systemic Contamination Control". The book also includes information on the Vickers concept of "ProActive Maintenance". The following recommendations are based on ISO cleanliness levels at 2 µm, 5 µm and 15 µm. For products in this catalog the recommended levels are:

Up to 210 bar (3000 psi) 19/17/14
Above 210 bar (3000 psi) 19/17/14

InstallationDimensions in mm (inches)

ECT Models

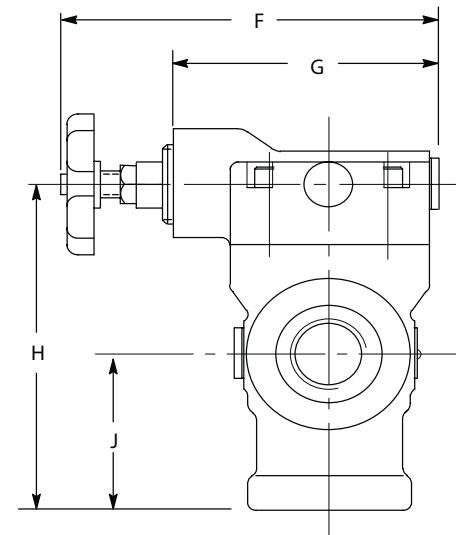
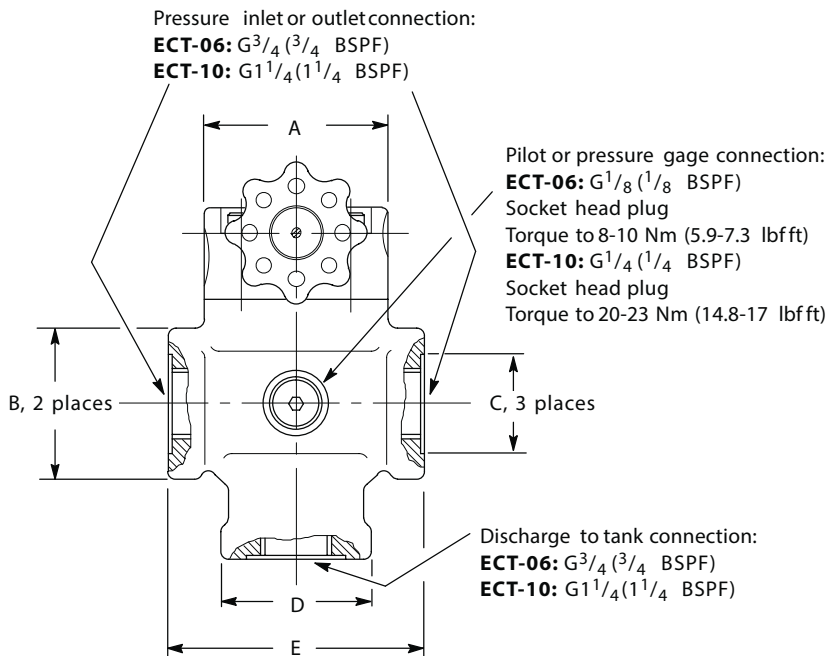
3rd angle
projection



Keylock Feature

"K" at Model Code [5]

To adjust pressure setting, insert key and turn clockwise. Turn micrometer knob clockwise to increase pressure setting; counter-clockwise to decrease setting. When key is removed the knob can spin freely without affecting the pressure setting.



Model	A	B	C	D	E	F	G	H	J	K
ECT-06*(V)-(K)-10TB	77,7 (3.06)	57,2 (2.25)	42,0 (1.65)	63,5 (2.5)	106,4 (4.19)	146,0 (5.75)	103,0 (4.06)	133,3 (5.25)	63,5 (2.5)	179 (7.05)
ECT-10*(V)-(K)-10TB	95,3 (3.76)	76,2 (3.0)	56,0 (2.2)	76,2 (3.0)	124,0 (4.88)	155,5 (6.12)	112,5 (4.43)	163,6 (6.44)	76,2 (3.0)	189 (7.44)

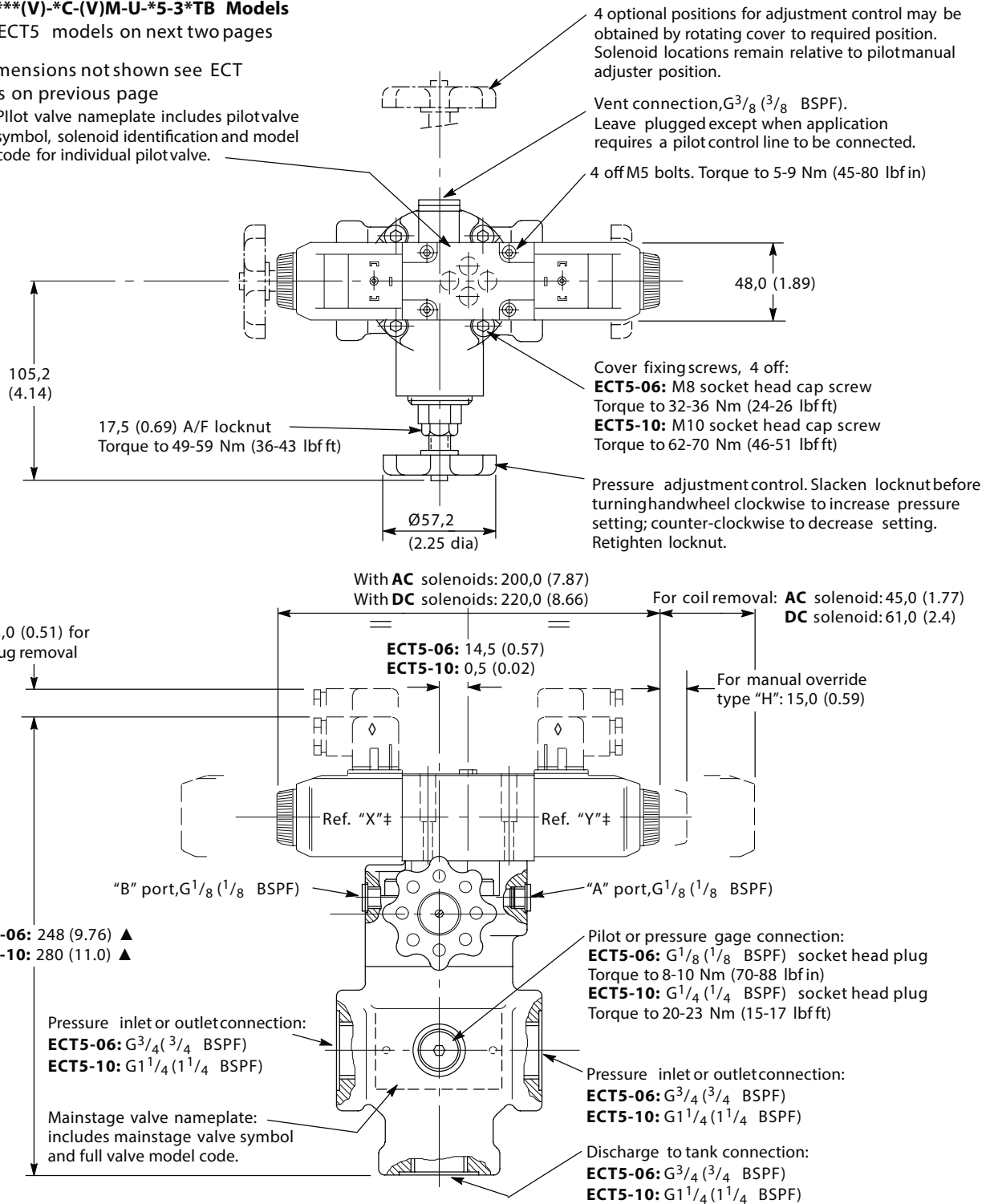
ECT5 Models

ECT5-***(V)-*C-(V)M-U-*5-3*TB Models

Other ECT5 models on next two pages

For dimensions not shown see ECT models on previous page

Pilot valve nameplate includes pilot valve symbol, solenoid identification and model code for individual pilot valve.



▲ May vary according to plug source.

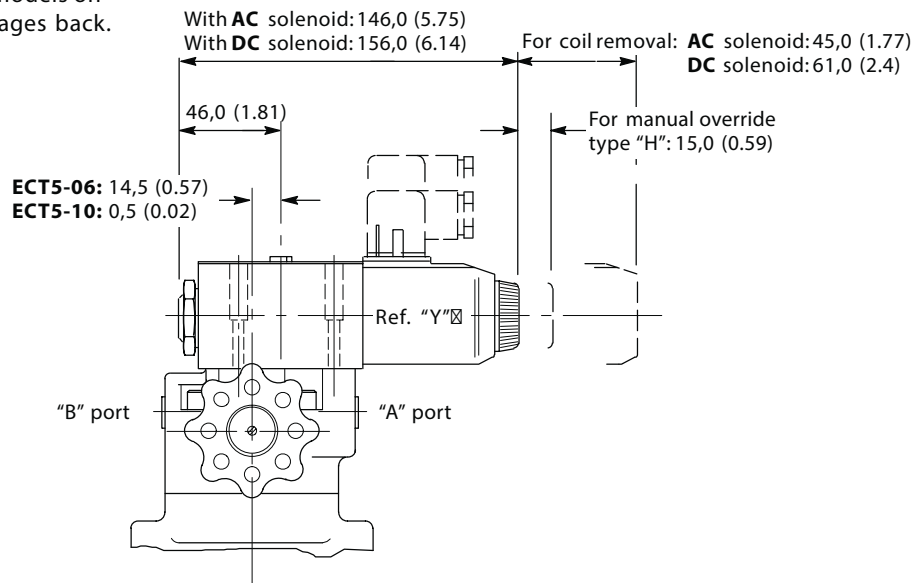
‡ See "Solenoid Identities", two pages on.

◇ Plug not supplied; order separately if required. For available plug types see section "Electrical Plugs and Connectors".

ECT5-***(V)(-K)-*A/B(L)(-*)-(V)M-U-5-3*TB Models

ECT5-***(V)-*A/B(-*)-(V)M-U-5-3*TB example

For dimensions not shown see ECT5 models on previous page and ECT models two pages back.

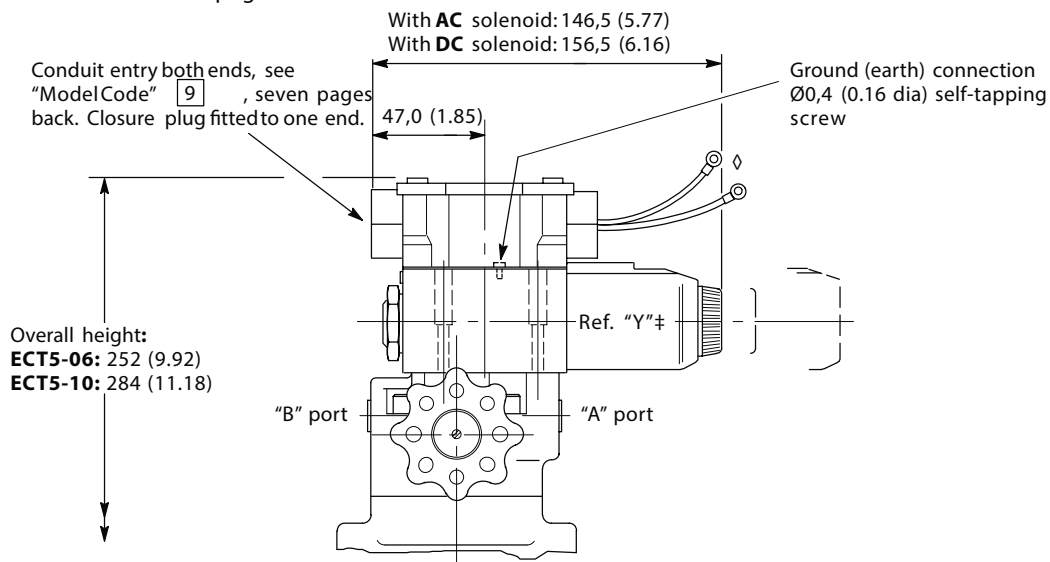


ECT5-***(V)(-K)-*A/B(L)(-*)-(V)M-FJ(L)-5-3*TB Models

ECT5-***(V)(-K)-*A/B(L)(-*)-(V)M-FW(L)-5-3*TB Models

ECT5-***(V)-*A/B(-*)-(V)M-FJ/W-5-3*TB example

For dimensions not shown see ECT5 models on previous page and ECT models two pages back.



‡ For ECT5-***(V)(-K)-*AL/BL models the pilotvalve solenoid and body end plug are interchanged from as shown. The solenoid reference then becomes "Ref. X". See "Solenoid Identities" next page.

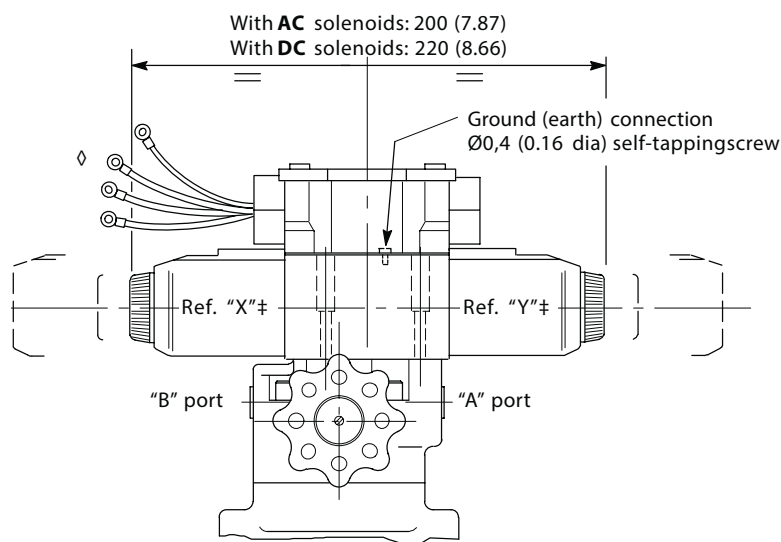
◇ Ref. ModelCode 9 :
Codes "FJ" and "FW": 2 lead wires for each solenoid, approx 150 (6.0) long. M3 terminals provided for customer connection.
Codes "FTJ" and "FTW": lead wires connected into terminal strip suitable for M3 terminals on customer connection.

ECT5-***(V)(-K)-*C(-*)-(V)M-FJ(L)-*5-3*TB Models

ECT5-***(V)(-K)-*C(-*)-(V)M-FW(L)-*5-3*TB Models

ECT5-***(V)-*C(-*)-(V)M-FJ/W*5-3*TB example

For dimensions not shown see ECT and ECT5 models three and two pages back respectively.



‡ See "Solenoid Identities" this page.

◇ Ref. Model Code **9** :

Codes "FJ" and "FW": 2 lead wires for each solenoid approx 150 (6.0) long. M3 terminals provided for customer connection.

Codes "FTJ" and "FTW": lead wires connected into terminal strip suitable for M3 terminals on customer connection.

Solenoid Identities

The solenoid identity("Sol. A"/Sol. B") is printed on the nameplate of the pilot valve of ECT5 models.

For ANSI/NFPA standard, no symbol at model code **8**:

Spool/spring code at model code 6	Solenoid identity	
	Ref. X	Ref. Y
0B	—	B
0BL	A	—
0C	A	B
2A	—	B
2AL	A	—
2C	A	B

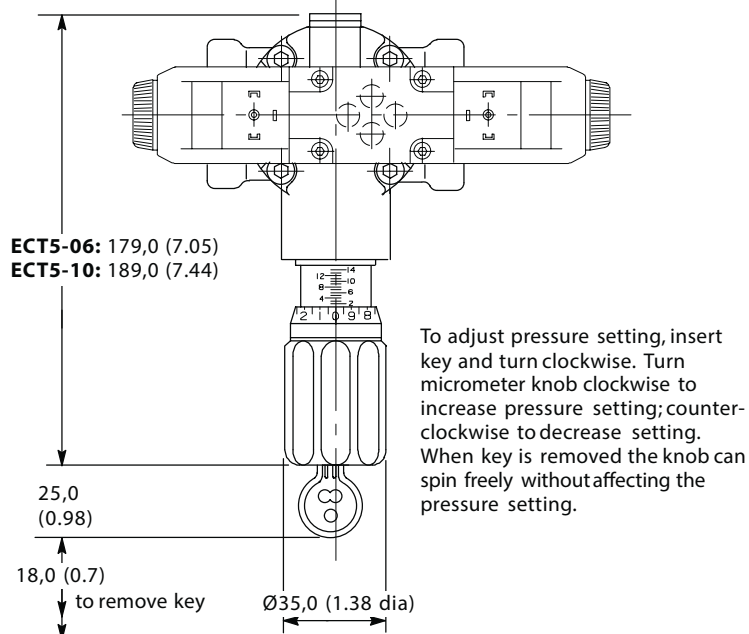
For German practice, "V" at model code **8**:

Spool/spring code at model code 6	Solenoid identity	
	Ref. X	Ref. Y
0B	—	A
0BL	B	—
0C	B	A
2A	—	A
2AL	B	—
2C	B	A

ECT5-***(V)-K-**(L)(-*)-(V)M-***(L)-*5-3*TB Models

ECT5-***(V)-K-**(L)(-*)-(V)M-U-*5-3*TB example

For dimensions not shown see ECT and ECT5 models three and two pages back respectively.



Electrical Plugs and Connectors

Plugs for ISO 4400 (DIN 43650) Type Coil Connection

For valves with type “U” coils (model code 9).

The cable entry on these plugs can be repositioned at 90° intervals by re-assembly of the contact holder relative to the plug housing. The cable entry is Pg11 for cable Ø 6-10 mm (0.24 to 0.39 dia.).

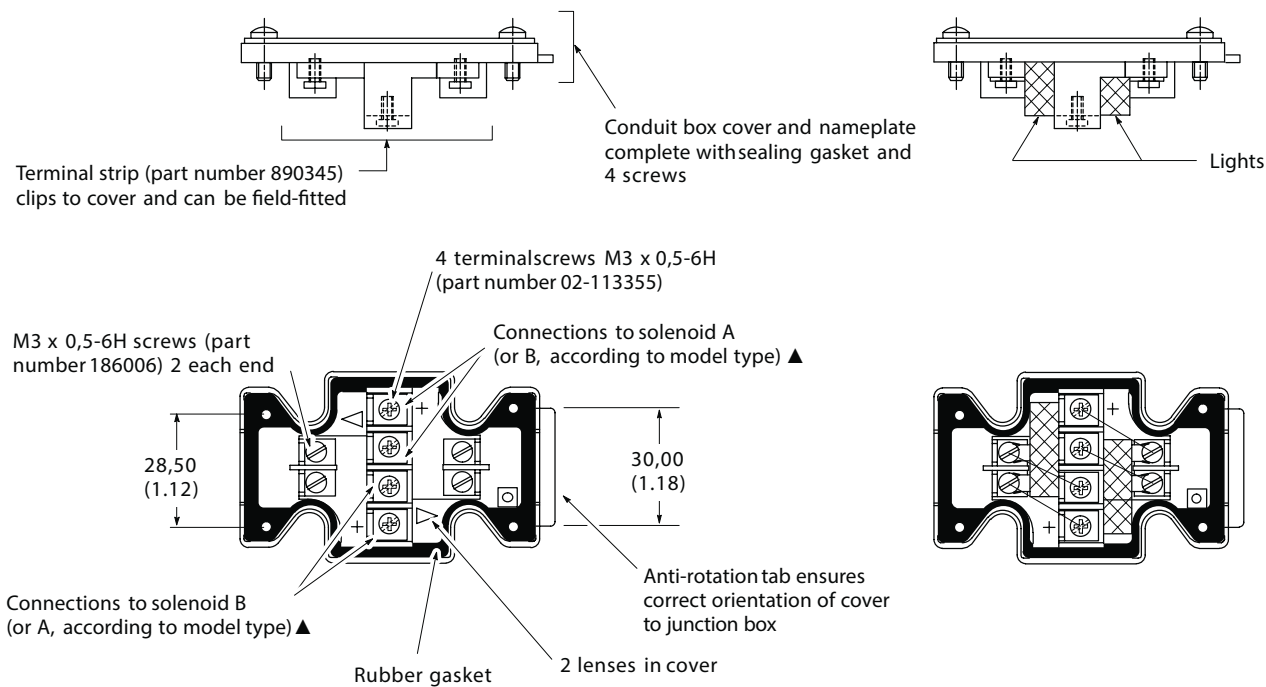
Order plugs separately by part number.

Voltage	Part number	
	Gray (Sol. A)	Black (Sol. B)
Without indicator light		
–	710776	710775
With indicator light		
12- 24V	977467	977466
100-125V	977469	977468
200-240V	977471	977470

Terminal Strip and Lights

For “FTJ” or “FTW” at model code 9

For “FTJL” or “FTWL” at model code 9 + 10



▲ 1. For DC coils the +ve lead(s) must be connected to the terminal(s) marked +. When using 3-wire incoming leads to double solenoid valves (i.e. common neutral) the inner pair of terminals must be linked.

2. For correct light indication of energized solenoid ensure that solenoid leads are correctly connected: light terminals are common with each outer pair of solenoid terminals according to the side with + mark.

Installation Data

Mounting attitude: unrestricted.

Mass (approx.), kg (lb)

ECT-06 4,5 (9.9)

ECT-10 9,1 (20.0)

ECT5 models	AC sol.	DC sol.
ECT5-06 with single solenoid	6,5 (14.3)	6,7 (14.7)
ECT5-06 with double solenoid	6,9 (15.2)	7,4 (16.3)
ECT5-10 with single solenoid	9,6 (21.1)	9,8 (21.6)
ECT5-10 with double solenoid	10,0 (22.0)	10,5 (23.1)

Ordering Procedure

Specify valves by full model code; plugs
by part number.

Products we offer:

- Cartridge valves
- DCV directional control valves
- Electric converters
- Electric machines
- Electric motors
- Gear motors
- Gear pumps
- Hydraulic integrated circuits (HICs)
- Hydrostatic motors
- Hydrostatic pumps
- Orbital motors
- PLUS+1® controllers
- PLUS+1® displays
- PLUS+1® joysticks and pedals
- PLUS+1® operator interfaces
- PLUS+1® sensors
- PLUS+1® software
- PLUS+1® software services, support and training
- Position controls and sensors
- PVG proportional valves
- Steering components and systems
- Telematics

Danfoss Power Solutions is a global manufacturer and supplier of high-quality hydraulic and electric components. We specialize in providing state-of-the-art technology and solutions that excel in the harsh operating conditions of the mobile off-highway market as well as the marine sector. Building on our extensive applications expertise, we work closely with you to ensure exceptional performance for a broad range of applications. We help you and other customers around the world speed up system development, reduce costs and bring vehicles and vessels to market faster.

Danfoss Power Solutions – your strongest partner in mobile hydraulics and mobile electrification.

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Hydro-Gear

www.hydro-gear.com

Daikin-Sauer-Danfoss

www.daikin-sauer-danfoss.com

**Danfoss
Power Solutions (US) Company**
2800 East 13th Street
Ames, IA 50010, USA
Phone: +1 515 239 6000

**Danfoss
Power Solutions GmbH & Co. OHG**
Krokamp 35
D-24539 Neumünster, Germany
Phone: +49 4321 871 0

**Danfoss
Power Solutions ApS**
Nordborgvej 81
DK-6430 Nordborg, Denmark
Phone: +45 7488 2222

**Danfoss
Power Solutions Trading
(Shanghai) Co., Ltd.**
Building #22, No. 1000 Jin Hai Rd
Jin Qiao, Pudong New District
Shanghai, China 201206
Phone: +86 21 2080 6201