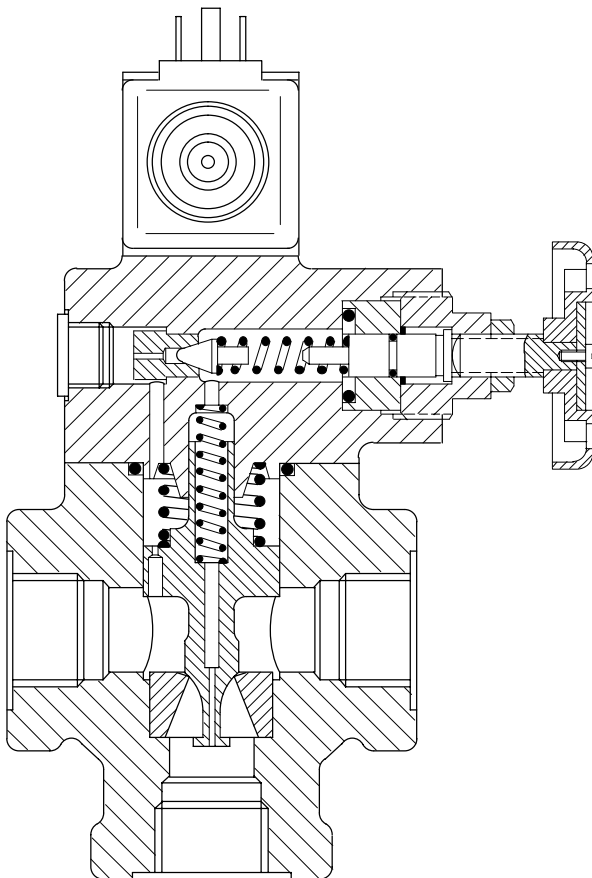**Vickers®**

Pressure Relief

EAT•N

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.

VICKERS

Functional Symbols

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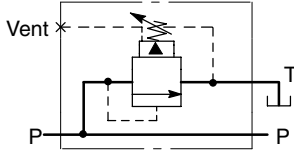
Notes:
1. All valves: Vent port fitted with removable plug.
2. ECT5 models: A and B ports fitted with removable plugs.
3. ECT5 models: Each valve carries two nameplates:
   The mainstage valve carries the lower half of the functional symbol and shows the full valve model code.
   The solenoid pilot valve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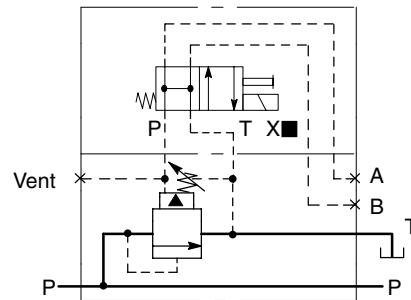

ECT5-***(V)-0B
Solenoid de-energized = Vented
Solenoid energized = On-load, by integral control
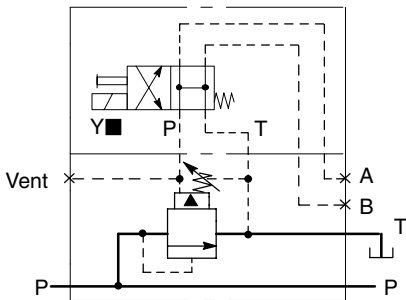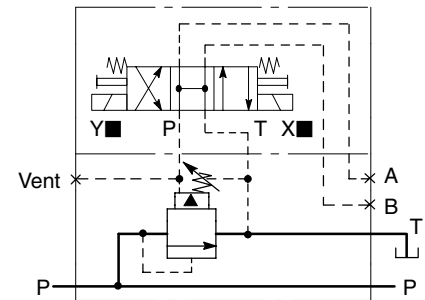

ECT5-***(V)-0BL
Solenoid de-energized = Vented
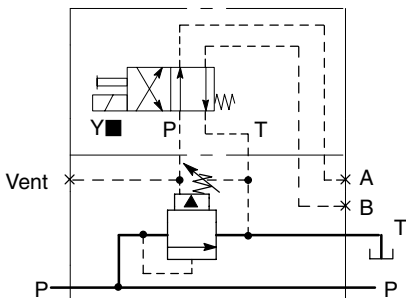Solenoid energized = On-load, by integral control

ECT5-***(V)-0C
Both solenoids de-energized = Vented
Right-hand solenoid■ energized = On-load, externally controlled at A
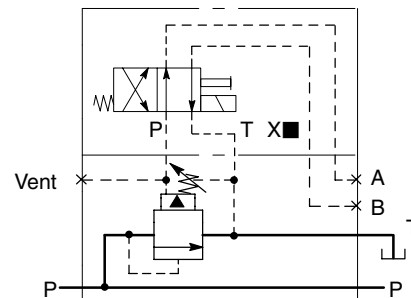Left-hand solenoid■ energized = On-load, externally controlled at B

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■ energized = On-load, externally controlled at A
Left-hand solenoid■ energized = On-load, externally controlled at B
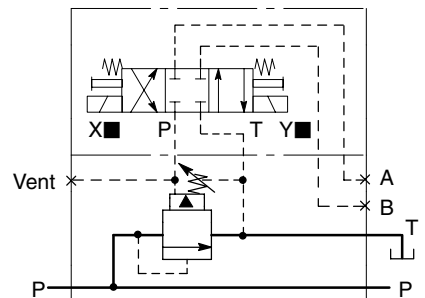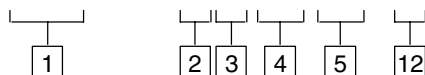

■ *For solenoid identities,"Sol. A"/"Sol. B", see nine pages on.*

Model Codes

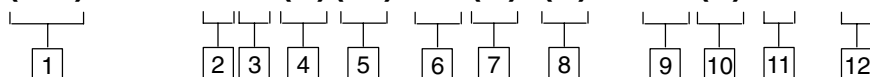Features in brackets ( ) may be omitted if not required. All other features must be specified.

Basic Models (Without Integral Solenoid Pilot Valve)

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

   1   2 3 4 5   12

Models With Integral Solenoid Pilot Valve

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

   1   2 3 4 5   6   7   8   9 10 11   12

---

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 = $^3/_4''$
10 = $1^1/_4''$

---

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

0B
0BL
0C   } See "Functional Symbols"
2A
2AL
2C

---

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 = $^1/_2''$ NPT thread conduit box
FTW= $^1/_2''$ 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
B▲ = 110V AC 50 Hz/120V AC 60 Hz
C = 220V AC 50 Hz
D▲ = 220V AC 50 Hz/240V AC 60 Hz
G = 12V DC
H = 24V DC
▲ *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 cSt (102 SUS) and at 50°C (122°F).

Maximum pressures:
Ports P, A, B and Vent
Port T▲:
  ECT, 10 series
  ECT5, 30 series
	250 bar (3625 psi)
	
	250 bar (3625 psi)
	100 bar (1450 psi)

▲ *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.*	*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
	
	IEC144, class IP65
	IEC144, class IP65
	Class H
	Class H
	Class F

| Power consumption for coils listed in "Model Code" ⑪:	Initial◆ VA (rms)	Holding VA (rms)

AC coils:
  Types A, C at 50 Hz
  Types B, D at 50 Hz
  Types B, D at 60 Hz
DC coils:
  G
  H
	
	225
	265
	260
	
	30W
	30W
		
		39
		49
		48
		
		–
		–

	◆ *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.

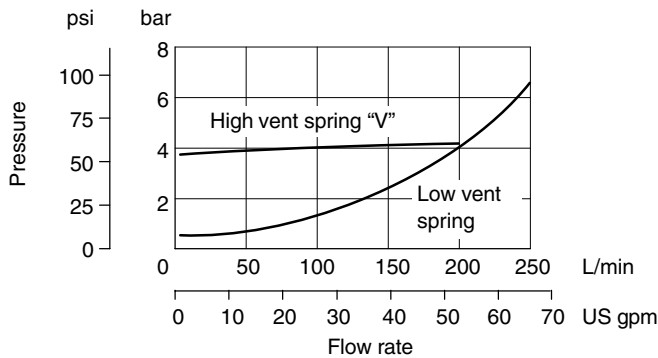**Pressure Override** at various settings

ECT(5)-06 models
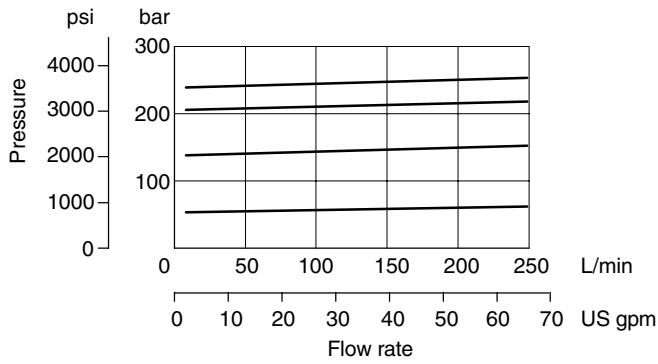
ECT(5)-10 models
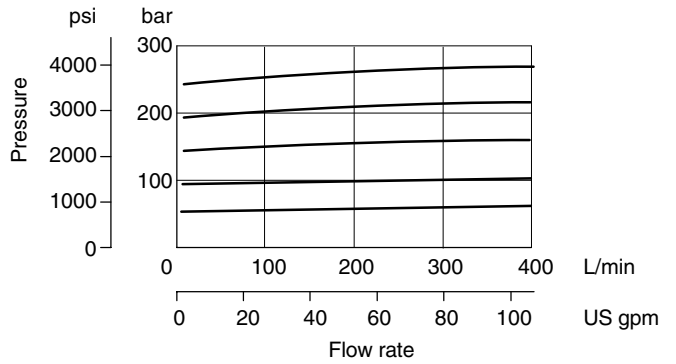
Vent Pressure Levels

ECT(5)-06 models

ECT(5)-10 models
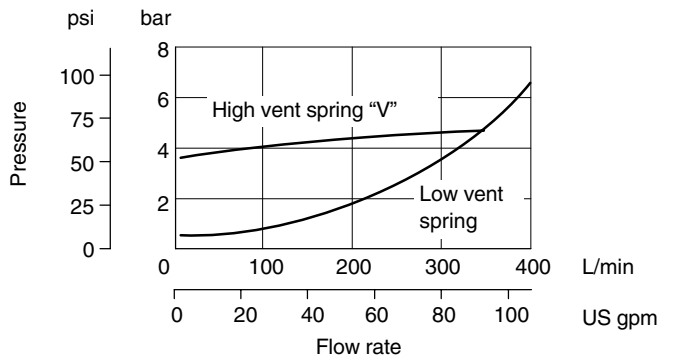
Vent Flow/Main Flow

Valid for ECT(5)-06 and -10 models
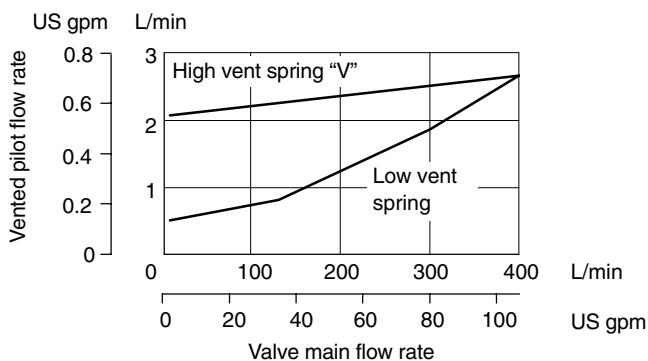
Thermal Stability
At various pressure settings and with flows:
ECT(5)-06 at 150 L/min (40 US gpm)
ECT(5)-10 at 300 L/min (80 US gpm)
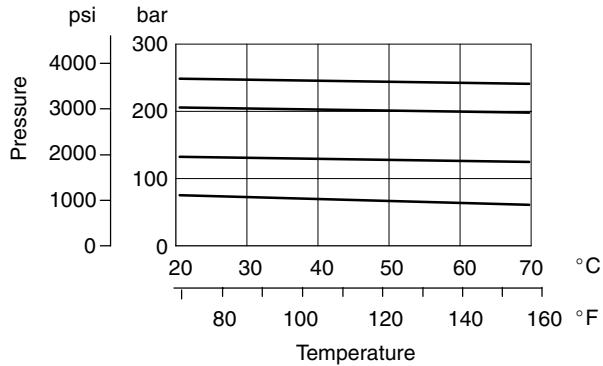
Under remote control conditions, vent line flow through pilot
relief valve set at various pressures; main valves at maximum
flow rates

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

ECT(5)-***V high vent pressure models
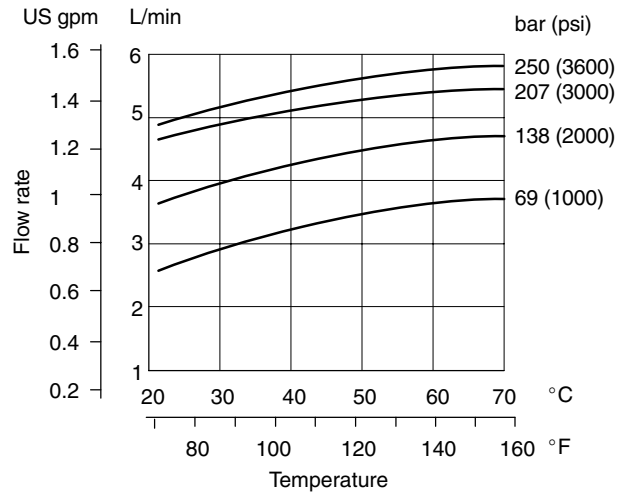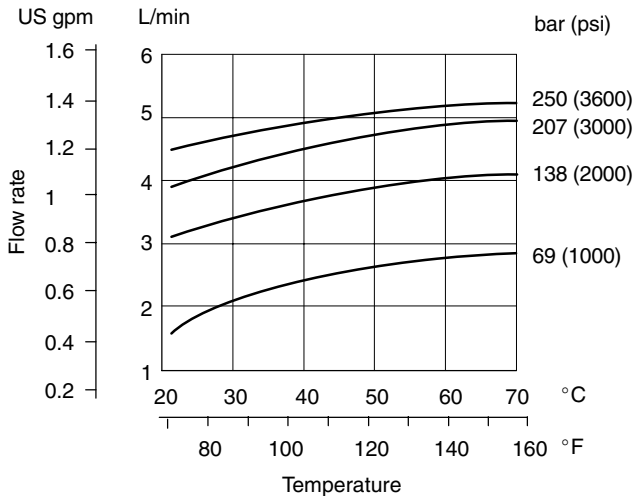
Response Times, ECT5 Models
Approximate times for selecting remote
and integral pressure settings from
when a signal is first applied at the
solenoid of an ECT5-***(V)-2** model.

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.

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.*

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.

Vent valve

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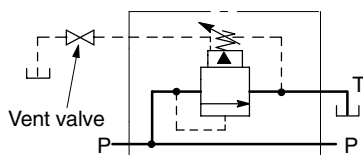Antiwear hydraulic oils (class L-HM)
Invert emulsions (class L-HFB)
Water glycol (class L-HFC)
Phosphate ester (class L-HFD),
adding "F3-" prefix at model code 1 .

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**

Installation Dimensions in mm (inches)

ECT Models

3rd angle projection

4 optional positions for adjustment control may be obtained by rotating cover to required position.

Vent connection, G$3/8$ ($3/8''$ BSPF). Leave plugged except when application requires a pilot control line to be connected.

18,0 (0.7) to remove key

25,0 (0.98)

K fully out

Ø35,0 (1.38 dia)

17,5 (0.69) A/F locknut. Torque to 49-59 Nm (36-43 lbf ft)

Cover fixing screws, 4 off:
ECT-06: M8 socket head cap screw Torque to 32-36 Nm (24-26 lbf ft)
ECT-10: M10 socket head cap screw Torque to 62-70 Nm (46-51 lbf ft)

Pressure adjustment control (no symbol at Model Code 5). Slacken locknut before turning handwheel clockwise to increase pressure setting; counter-clockwise to decrease setting. Retighten locknut.

Ø57,2 (2.25 dia)

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.

Pressure inlet or outlet connection:
ECT-06: G$3/4$ ($3/4''$ BSPF)
ECT-10: G$1 1/4$ ($1 1/4''$ BSPF)

Pilot or pressure gage connection:
ECT-06: G$1/8$ ($1/8''$ BSPF) Socket head plug Torque to 8-10 Nm (5.9-7.3 lbf ft)
ECT-10: G$1/4$ ($1/4''$ BSPF) Socket head plug Torque to 20-23 Nm (14.8-17 lbf ft)

B, 2 places

C, 3 places

Discharge to tank connection:
ECT-06: G$3/4$ ($3/4''$ BSPF)
ECT-10: G$1 1/4$ ($1 1/4''$ BSPF)
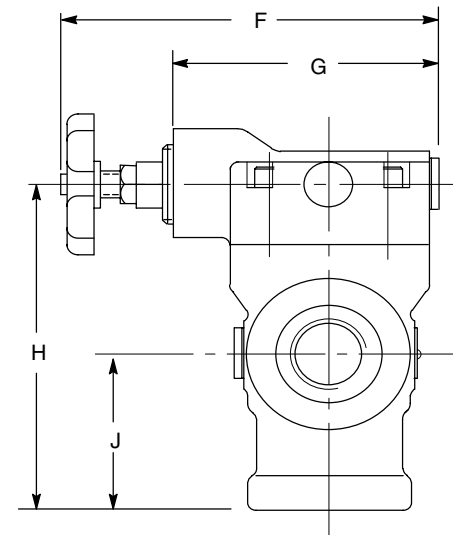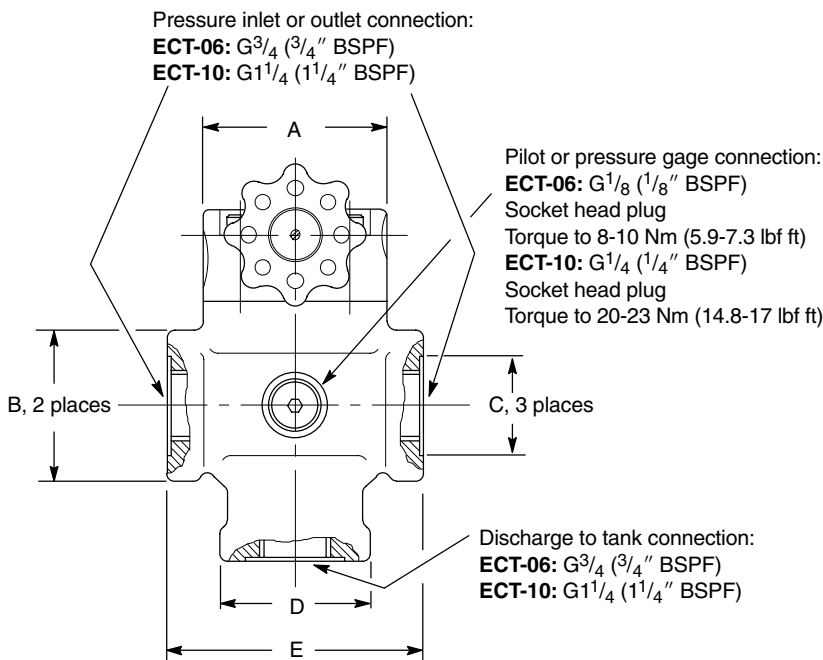
Model	A	B	C	D	E	F	G	H	J	K
ECT-06*(V)-(K)-10TB	77,7 (3.06)	57,2 (2.25)	42,0 (1.65)	63,5 (2.5)	106,4 (4.19)	146,0 (5.75)	103,0 (4.06)	133,3 (5.25)	63,5 (2.5)	179 (7.05)
ECT-10*(V)-(K)-10TB	95,3 (3.76)	76,2 (3.0)	56,0 (2.2)	76,2 (3.0)	124,0 (4.88)	155,5 (6.12)	112,5 (4.43)	163,6 (6.44)	76,2 (3.0)	189 (7.44)

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.

4 optional positions for adjustment control may be
obtained by rotating cover to required position.
Solenoid locations remain relative to pilot manual
adjuster position.

Vent connection, $G^3/_8$ ($^3/_8$″ BSPF).
Leave plugged except when application
requires a pilot control line to be connected.

4 off M5 bolts. Torque to 5-9 Nm (45-80 lbf in)

48,0 (1.89)

105,2
(4.14)

17,5 (0.69) A/F locknut
Torque to 49-59 Nm (36-43 lbf ft)
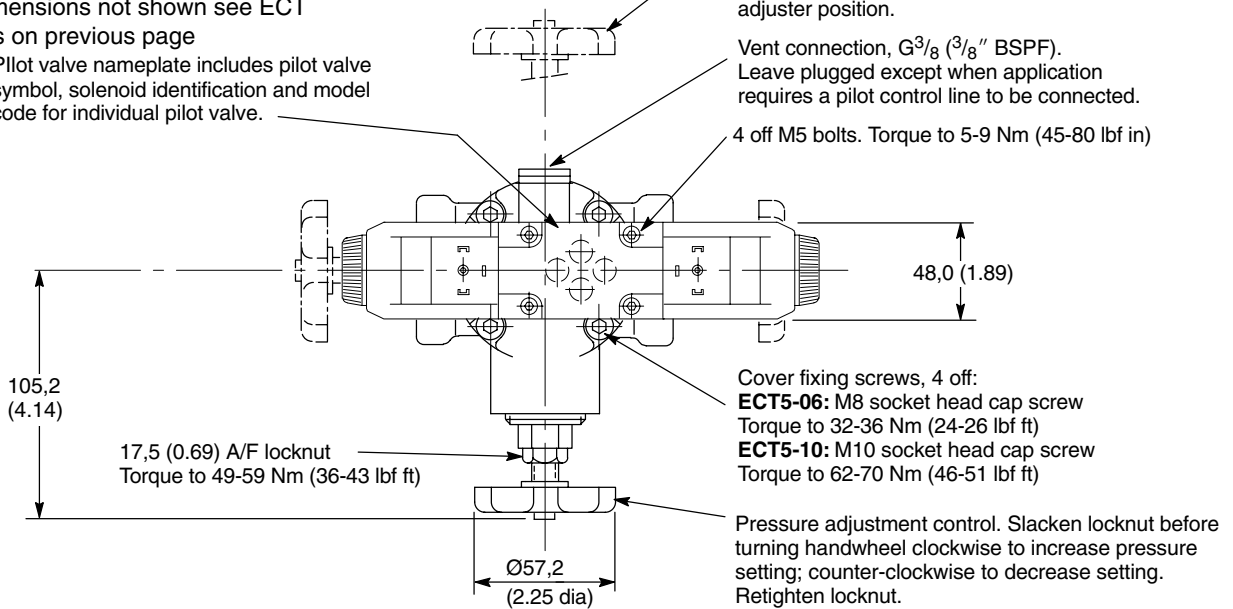
Cover fixing screws, 4 off:
ECT5-06: M8 socket head cap screw
Torque to 32-36 Nm (24-26 lbf ft)
ECT5-10: M10 socket head cap screw
Torque to 62-70 Nm (46-51 lbf ft)

Pressure adjustment control. Slacken locknut before
turning handwheel clockwise to increase pressure
setting; counter-clockwise to decrease setting.
Retighten locknut.

Ø57,2
(2.25 dia)
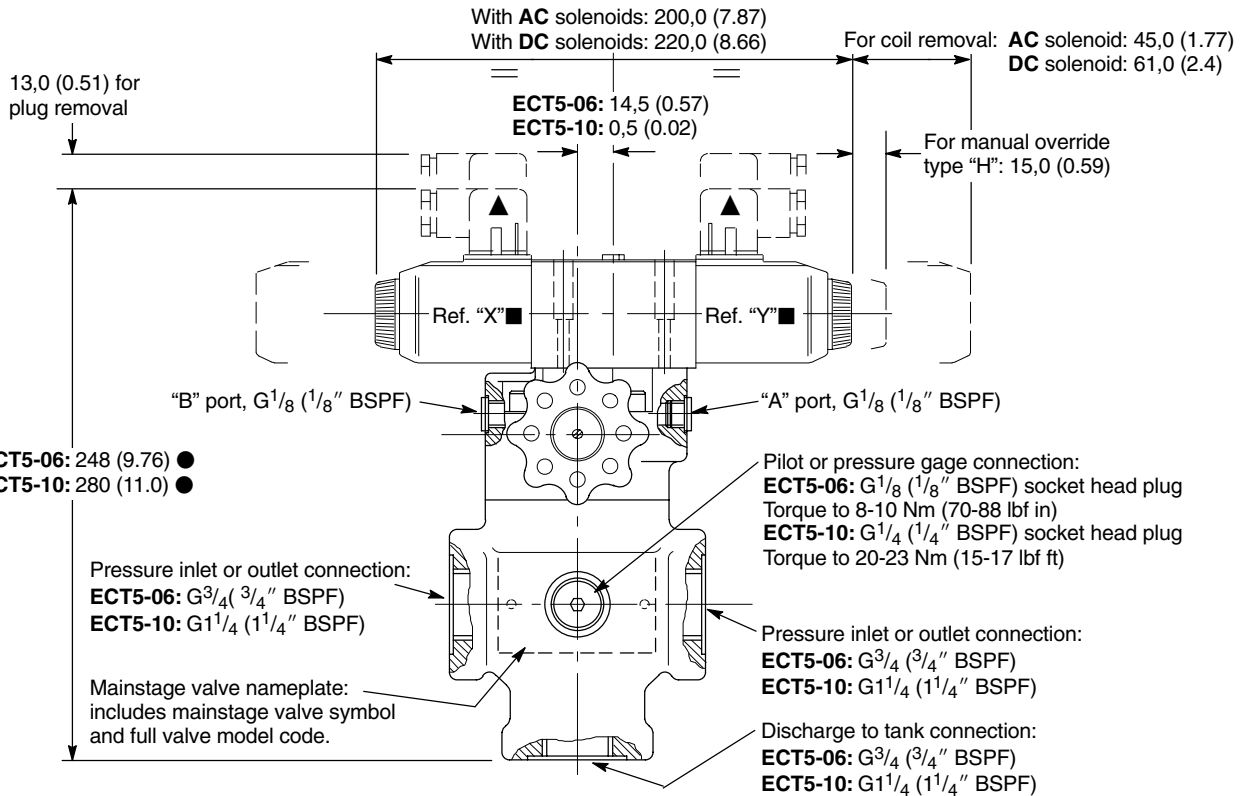
With **AC** solenoids: 200,0 (7.87)
With **DC** solenoids: 220,0 (8.66)

For coil removal: **AC** solenoid: 45,0 (1.77)
DC solenoid: 61,0 (2.4)

13,0 (0.51) for
plug removal

ECT5-06: 14,5 (0.57)
ECT5-10: 0,5 (0.02)

For manual override
type "H": 15,0 (0.59)

Ref. "X"■

Ref. "Y"■

"B" port, $G^1/_8$ ($^1/_8$″ BSPF)

"A" port, $G^1/_8$ ($^1/_8$″ BSPF)

ECT5-06: 248 (9.76) ●
ECT5-10: 280 (11.0) ●

Pilot or pressure gage connection:
ECT5-06: $G^1/_8$ ($^1/_8$″ BSPF) socket head plug
Torque to 8-10 Nm (70-88 lbf in)
ECT5-10: $G^1/_4$ ($^1/_4$″ BSPF) socket head plug
Torque to 20-23 Nm (15-17 lbf ft)

Pressure inlet or outlet connection:
ECT5-06: $G^3/_4$ ($^3/_4$″ BSPF)
ECT5-10: $G1^1/_4$ ($1^1/_4$″ BSPF)

Pressure inlet or outlet connection:
ECT5-06: $G^3/_4$ ($^3/_4$″ BSPF)
ECT5-10: $G1^1/_4$ ($1^1/_4$″ BSPF)

Mainstage valve nameplate:
includes mainstage valve symbol
and full valve model code.

Discharge to tank connection:
ECT5-06: $G^3/_4$ ($^3/_4$″ BSPF)
ECT5-10: $G1^1/_4$ ($1^1/_4$″ BSPF)

● *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.

With **AC** solenoid: 146,0 (5.75)
With **DC** solenoid: 156,0 (6.14)

For coil removal: **AC** solenoid: 45,0 (1.77)
DC solenoid: 61,0 (2.4)

46,0 (1.81)

For manual override
type "H": 15,0 (0.59)

ECT5-06: 14,5 (0.57)
ECT5-10: 0,5 (0.02)

Ref. "Y"■

"B" port

"A" port
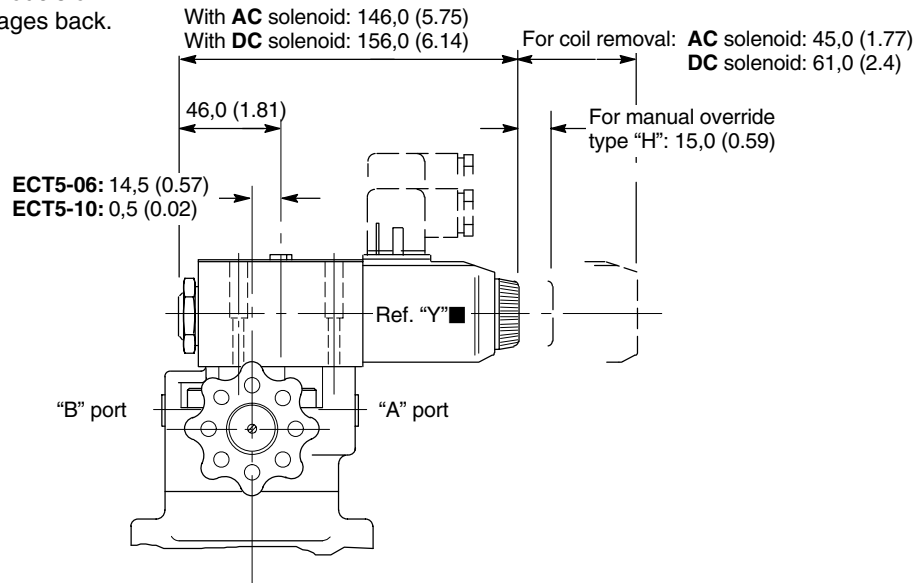
ECT5-***(V)(-K)-*A/B(L)(-*)-(V)M-FJ(L)-*5-3*TB Models
ECT5-***(V)(-K)-*A/B(L)(-*)-(V)M-FW(L)-*5-3*TB Models
ECT5-***(V)-*A/B(-*)-(V)M-FJ/W*5-3*TB example

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

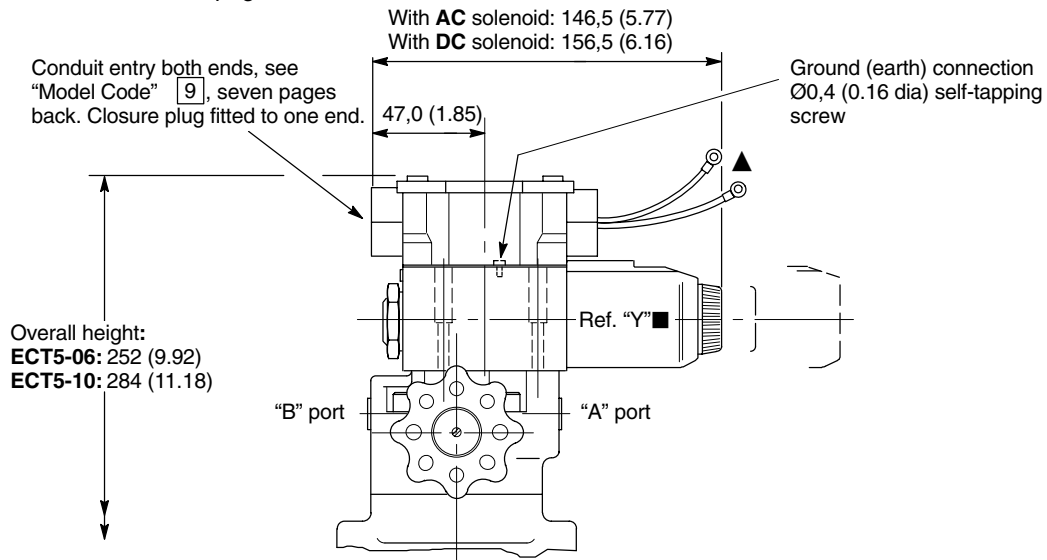With **AC** solenoid: 146,5 (5.77)
With **DC** solenoid: 156,5 (6.16)

Conduit entry both ends, see
"Model Code" 9 , seven pages
back. Closure plug fitted to one end.

47,0 (1.85)

Ground (earth) connection
Ø0,4 (0.16 dia) self-tapping
screw

▲

Overall height**:**
ECT5-06: 252 (9.92)
ECT5-10: 284 (11.18)

Ref. "Y"■

"B" port

"A" port

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

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.

With **AC** solenoids: 200 (7.87)
With **DC** solenoids: 220 (8.66)

Ground (earth) connection
Ø0,4 (0.16 dia) self-tapping screw

Ref. "X"■   Ref. "Y"■

"B" port   "A" port

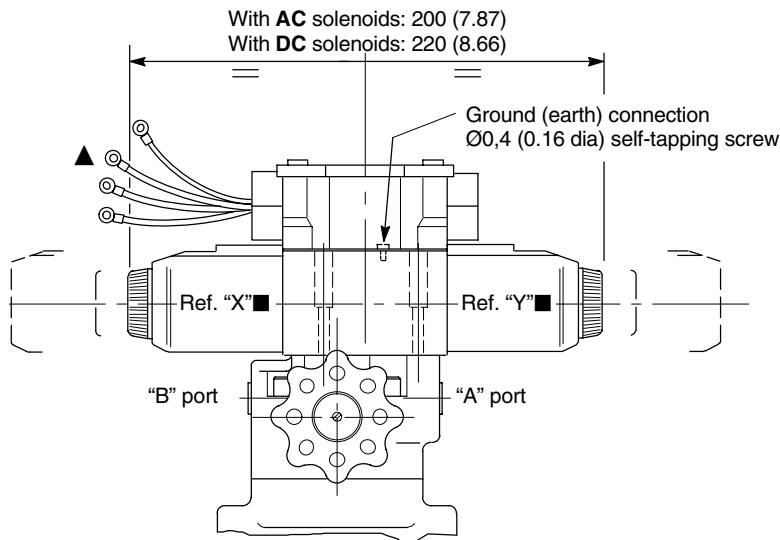■ *See "Solenoid Identities" this page.*
▲ *Ref. Model Code* 9 *:*
  *Codes "FJ" and "FW": 2 lead wires for each solenoid approx 150 (6.0) long. M3 terminals
  provided for customer connection.*
  *Codes "FTJ" and "FTW": lead wires connected into terminal strip suitable for M3 terminals
  on customer connection.*

Solenoid Identities
The solenoid identity ("Sol. A"/Sol. B") is
printed on the nameplate of the pilot
valve of ECT5 models.
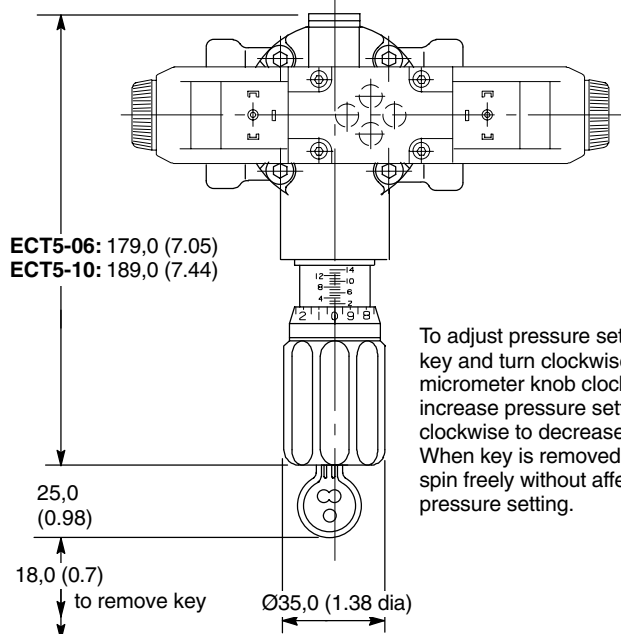
For ANSI/NFPA standard, no symbol at
model code 8 :

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.

ECT5-06: 179,0 (7.05)
ECT5-10: 189,0 (7.44)

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.

25,0
(0.98)

18,0 (0.7)
to remove key   Ø35,0 (1.38 dia)

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).
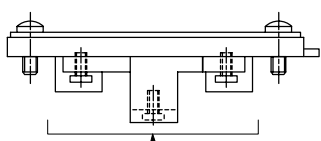
Order plugs separately by part number.

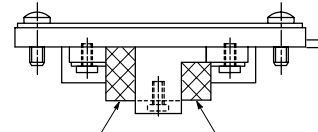| Voltage	Part number	
	Gray (Sol. A)	Black (Sol. B)
Without indicator light		
–	710776	710775
With indicator light		
12- 24V	977467	977466
100-125V	977469	977468
200-240V	977471	977470

Terminal Strip and Lights

For "FTJ" or "FTW" at model code ⑨

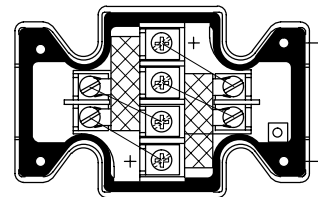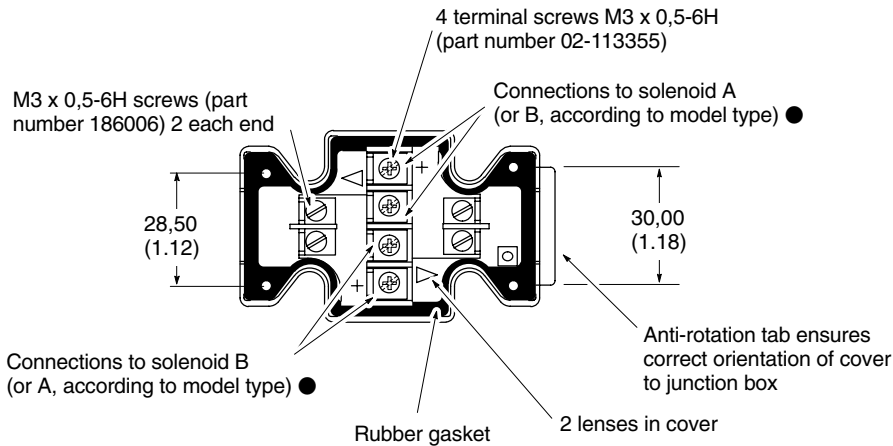For "FTJL" or "FTWL" at model code ⑨ + ⑩

Terminal strip (part number 890345) clips to cover and can be field-fitted

Conduit box cover and nameplate complete with sealing gasket and 4 screws

Lights

4 terminal screws M3 x 0,5-6H (part number 02-113355)

Connections to solenoid A (or B, according to model type) ●

M3 x 0,5-6H screws (part number 186006) 2 each end

28,50 (1.12)

30,00 (1.18)

Connections to solenoid B (or A, according to model type) ●

Anti-rotation tab ensures correct orientation of cover to junction box

Rubber gasket

2 lenses in cover

● 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.