Enclosed control support

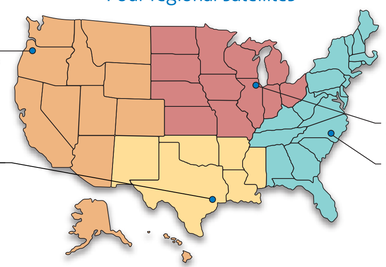
Enclosed control satellite product offering

- Type 1, 12, 3R, 4, 4X and 7/9 enclosures
- Non-combination starters
- Combination starters—non-fusible/fusible and circuit breaker
- Full voltage non-reversing, reversing and multi-speed
- Freedom™ (NEMA® Size 00–5) vacuum contactors, soft starters, lighting contactors
- Modifications including cover control, CPTs, auxiliary contacts, heaters and more

Eaton provides enclosed control solutions that are unmatched in the industry

- Local assembly and manufacturing capabilities
- Assembly and wiring of enclosed control
- Customized enclosed motor starting and lighting panels
- Modified pump panels
- Engineering support
- Custom AutoCAD® drawing capabilities
- Quick-ship capabilities
- Customer visits are welcome

Four regional satellites



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Pre-engineered packaged control

Enclosed control reference guide

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Packaged control meets your motor control needs

From autotransformers and lighting contactors to reduced voltage and ***XT*** starters, enclosed control from Eaton can be part of the solution in project construction, OEM, and other electrical market applications because of its expansive product offering and custom capabilities.

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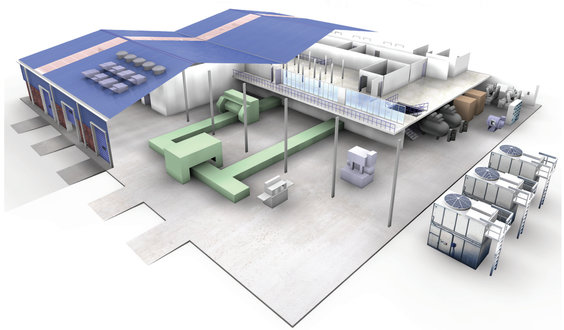

Enclosed control Freedom and *XT*

NEMA®

ECN 22 2 1 A A F❶ -

NEMA design
H = Freedom HVAC ❷
N = Freedom
P = Irrigation pump panel ❸

NEMA size
A = 00 | 5 = 5
0 = 0 | 6 = 6
1 = 1 | 7 = 7
2 = 2 | 8 = 8
3 = 3 | 9 = 9
4 = 4

Cover control (starters only)
See **charts 3 & 4**

Coil voltage and/or control transformer
See **charts 1 & 2**

Modification codes
See **charts 6 & 7**

Class
01 = Contactors
02 = Reversing contactors
05 = FVNR starter, non-combination
06 = Reversing, non-combination
07 = FVNR non-combination, with CPT
16 = Combination with disconnect switch
17 = Reversing, combination with disconnect switch
18 = Combination with disconnect switch, with CPT
22 = Combination with circuit breaker
23 = Reversing, combination with circuit breaker
24 = Combination with circuit breaker, with CPT
33 = Multi-speed 2S2W non-combination
34 = Multi-speed 2S1W CT or VT non-combination
35 = Multi-speed 2S1W CH non-combination
36 = Multi-speed with disconnect switch, 2S2W
37 = Multi-speed with disconnect switch, 2S1W CT or VT
38 = Multi-speed with disconnect switch, 2S1W CH
39 = Multi-speed with circuit breaker, 2S2W
40 = Multi-speed with circuit breaker, 2S1W CT or VT
41 = Multi-speed with circuit breaker, 2S1W CH
42 = Autotransformer, non-combination
43 = Autotransformer, with disconnect switch
44 = Autotransformer, with circuit breaker
45 = Part-winding, non-combination
46 = Part-winding, with disconnect switch
47 = Part-winding, with thermal-magnetic circuit breakers
48 = Y-D, open transition, non-combination
49 = Y-D, open transition, with disconnect switch
50 = Y-D, open transition, with thermal-magnetic circuit breakers
51 = Y-D, closed transition, non-combination
52 = Y-D, closed transition, with disconnect switch
53 = Y-D, closed transition, with thermal-magnetic circuit breakers
54 = Type 3R pump panel, with disconnect switch ❹
55 = Type 3R pump panel, with circuit breaker ❹
62 = Autotransformer pump panel, disconnect switch
63 = Autotransformer pump panel, circuit breaker
64 = Part-winding pump panel, disconnect
65 = Part-winding pump panel, circuit breaker
68 = Duplex, non-combination
69 = Duplex, with disconnect switch
70 = Duplex, with circuit breaker

Disconnect fuse clip ratings
– = None
B = 30 A/250 V (R)
C = 30 A/600 V (R)
D = 60 A/250 V (R)
E = 60 A/600 V (R)
F = 100 A/250 V (R)
G = 100 A/600 V (R)
H = 200 A/250 V (R)
J = 200 A/600 V (R)
K = 400 A/250 V (R)
L = 400 A/600 V (R)
M = 600 A/250 V (R)
N = 600 A/600 V (R)
P = 800 A/600 V (R)
Q = 1200 A/600 V (L)
R = 1600 A/600 V (L)
S = 2000 A/600 V (L)
T = By description

Circuit breaker ratings
A = None | G = 100 A | N = 1000 A
B = 3 A | H = 150 A | P = 1200 A
C = 7 A | J = 250 A | Q = 2000 A
D = 15 A | K = 400 A | R = 3000 A
E = 30 A | L = 600 A | T = By description
F = 50 A | M = 800 A
W = 70 A

Enclosure type
1 = Type 1—general purpose
2 = Type 3R—rainproof
3 = Type 4—watertight (painted steel)
4 = Type 4X—watertight (stainless steel)
5 = Type 4X—corrosion (non-metallic)
6 = Type 7/9—bolted hazardous location
7 = Type 7/9—threaded hazardous location
8 = Type 12—dust-tight
9 = Type 4X—stainless steel (316-Grade)
A = Type 3R—rainproof (304-Grade stainless steel)

NEMA size starter	Amperes rating	Horsepower rating (volts) 60 Hz						
		Single-phase		Three-phase				
		115	230	200	230	460	575
00	9	0.33	1	1.5	1.5	2	2
0	18	1	2	3	3	5	5
1	27	2	3	7.5	7.5	10	10
2	45	3	7.5	10	15	25	25
3	90	7.5	15	25	30	50	50
4	135	—	—	40	50	100	100
5	270	—	—	75	100	200	200

❶ See Freedom HVAC starters catalog numbering system.

❷ ECP irrigation pump panels valid with Class 54, 55 only.

❸ Pump panels standard options included: NEMA Type 3R, Start PB, HOA selector switch.

❹ For non-combination contactors and starters, include the letter (**A**) as the 10th character.

IEC

ECX 05 D 1 A A A - _

IEC design
X = *XT* ❶

Class
09 = Non-combination, non-reversing starter
10 = Non-combination, reversing starter
11 = Non-combination, non-reversing starter with CPT
19 = Combination, non-reversing starter with disconnect switch
20 = Combination, reversing starter with disconnect switch
25 = Combination, non-reversing starter with circuit breaker
26 = Combination, reversing starter with circuit breaker
76 = Combination motor controller
77 = Reversing combination motor controller

Ampere rating (UL 600 V)

XT	IEC
B	= 7 A
C	= 9 A
D	= 12 A
E	= 15 A
F	= 18 A
G	= 25 A
H	= 32 A
J	= 40 A
K	= 50 A
L	= 65 A
M	= 80 A
N	= 95 A
P	= 115 A
Q	= 150 A

Modification codes
See **chart 5** for thermal overload relay, **chart 6** for solid-state overload relay and **chart 7**.

Disconnect fuse clip ratings
A = None
B = 30 A/250 V (R)
C = 30 A/600 V (R)
D = 60 A/250 V (R)
E = 60 A/600 V (R)
G = 100 A (J)

Circuit breaker ratings
A = None | W = 70 A
B = 3 A | G = 100 A
C = 7 A | H = 150 A
D = 15 A | J = 250 A
E = 30 A

Cover control (starters only)
See **charts 3 & 4**

Coil voltage and/or control transformer
See **charts 1 & 2**

Enclosure type
1 = Type 1—general purpose
2 = Type 3R—rainproof
3 = Type 4—watertight (painted steel)
4 = Type 4X—watertight (stainless steel)
5 = Type 4X—corrosion (non-metallic)
8 = Type 12—dust-tight
9 = Type 4X—stainless steel (316 Grade)

❶ For *XT* IEC starters, add an 11th character for the corresponding overload selection.

Enclosed control lighting contactors

ECL 12 D 1 A 3 E - _

Design
L = Lighting—CN35 or A202
C = Lighting—C30CN ❶

Class
03 = Contactors—electrically held CN35/C30CN
04 = Contactors—mechanically held C30CN, magnetic A202
12 = Combination, fusible—electrically held
13 = Combination, fusible—mechanically/magnetically held
14 = Combination, thermal-magnetic circuit breakers—electrically held
15 = Combination, thermal-magnetic circuit breakers—mechanically/magnetically held

Ampere rating
A = 10 A | E = 100 A
B = 20 A | F = 200 A
C = 30 A | G = 300 A
D = 60 A | H = 400 A
C30CN = 30 A only

Enclosure type
1 = Type 1—general purpose
2 = Type 3R—rainproof
3 = Type 4—watertight (painted steel)
4 = Type 4X—watertight (stainless steel)
6 = Type 7/9—bolted hazardous location
7 = Type 7/9—threaded hazardous location
8 = Type 12—dust-tight
9 = Type 4X—stainless steel (316 Grade)

Coil voltage
See **charts 1 & 2**

Modification codes
(Including cover control)
See **chart 7**

Disconnect fuse clip ratings
A = None
B = 30 A/250 V
C = 30 A/600 V
D = 60 A/250 V
E = 60 A/600 V
F = 100 A/250 V
G = 100 A/600 V
H = 200 A/250 V
J = 200 A/600 V
K = 400 A/250 V
L = 400 A/600 V
M = 600 A/250 V
N = 600 A/600 V
P = 800 A/600 V
T = By description

Thermal-magnetic breaker ratings
A = None
D = 20 A
E = 30 A
F = 60 A
G = 100 A
H = 200 A
J = 300 A
K = 400 A
L = 600 A
M = 800 A
T = By description

Total number of poles ❷
2 = 2 poles required
3 = 3 poles required
4 = 4 poles required
5 = 5 poles required
6 = 6 poles required
7 = 7 poles required
8 = 8 poles required
9 = 9 poles required
A = 10 poles
B = 12 poles
C = 20 poles
Z = Consult factory

Combination devices—three-pole only. For other poles, consult factory.

❶ C30CN = 30 A only.

❷ For NC poles on ECC product, see modification codes.

Enclosed control solid-state soft starters

ECS 92 W 2 Q A H - _

Design
S = Soft starter

Class
90 = S801 non-combination
91 = S801 combination with disconnect switch
92 = S801 combination with circuit breaker
93 = S811 non-combination
94 = S811 combination with disconnect switch
95 = S811 combination with circuit breaker
96 = S811 non-combination
97 = S811 combination with disconnect switch
98 = S811 combination with circuit breaker

Ampere rating

S811	S801/S811
R = 52 A	Q = 37 A
S = 65 A	S = 66 A
T = 77 A	V = 105 A
V = 99 A	W = 135 A
W = 125 A	Y = 180 A
X = 156 A	Z = 240 A
Y = 180 A	1 = 304 A
Z = 242 A	2 = 360 A
1 = 302 A	3 = 420 A
2 = 361 A	4 = 500 A
3 = 414 A	5 = 650 A
	6 = 720 A
	7 = 850 A
	8 = 1000 A

Enclosure type
1 = Type 1—general purpose
2 = Type 3R—rainproof
3 = Type 4—watertight (painted steel)
4 = Type 4X—watertight (stainless steel)
6 = Type 7/9—bolted hazardous location
7 = Type 7/9—threaded hazardous location
8 = Type 12—dust-tight
9 = Type 4X—stainless steel (316-Grade)

Control power transformer
See **chart 2**

Modification codes
See **chart 7**

Disconnect fuse clip ratings
A = None
B = 30 A/250 V (J)
C = 30 A/600 V (J)
D = 60 A/250 V (J)
E = 60 A/600 V (J)
F = 100 A/250 V (J)
G = 100 A/600 V (J)

Circuit Breaker Ratings
A = None
B = 3A
C = 7A
D = 15A
E = 30A
F = 50A
G = 100A

Cover control
A = None
H = HOA
J = HOA & red light

Freedom HVAC starters

ECH 22 0 1 A H - _

Design
H = HVAC control

Class
16 = Disconnect switch
18 = Disconnect switch with CPT
22 = Circuit breaker
24 = Circuit breaker with CPT

NEMA Size
0 = Size 0
1 = Size 1
2 = Size 2
3 = Size 3

Enclosure Type
1 = Type 1
2 = Type 3R rainproof
8 = Type 12 dust-tight

Magnet Coil/CPT Voltage

Without CPT	CPT Primary/Secondary
A = 120 V/60 Hz	B = 240 V/120 V
B = 240 V/60 Hz	C = 480 V/120 V
C = 460 V/60 Hz	D = 575 V/120 V
D = 575 V/60 Hz	E = 208 V/120 V
E = 208 V/60 Hz	S = 480 V/24 V
T = 24 V/60 Hz	T = 600 V/24 V

Modification Codes
See **chart 7**

Disconnect Fuse Clip Ratings
A = None
B = 30 A/250 V (J)
C = 30 A/600 V (J)
D = 60 A/250 V (J)
E = 60 A/600 V (J)
F = 100 A/250 V (J)
G = 100 A/600 V (J)

Circuit Breaker Ratings
A = None
B = 3A
C = 7A
D = 15A
E = 30A
F = 50A
G = 100A

Cover Control
A = None
H = HOA
J = HOA & red light

Chart 1: Magnet coil codes (system voltage) ❶

A = 120/60 110/50	K = 240/50	U = 24/50
B = 240/60 220/50	L = 380/50	V = 32/50
C = 480/60 440/50	M = 415/50	W = 48/60
D = 575/60 550/50	P = 12 Vdc	X = 104–120/60
E = 208/60	Q = 24 Vdc	Y = 48/50
G = 550/50	R = 48 Vdc	Z = By description
H = 277/60	S = 120/125 Vdc	
J = 208–240/60	T = 24/60	

Chart 2: Control power transformer codes (system voltage)

Code	Primary	Secondary
B =	240/480–220/440 wired for 240	120/60–110/50
C =	240/480–220/440 wired for 480	120/60–110/50
D =	575/60–550/50	120/60–110/50
E =	208/60	120/60
H =	277/60	120/60
K =	380/415 V	220 V
L =	380/50	110/50
M =	415/50	110/50
F =	120/60	24
Q =	208/60	24
R =	240/480–220/440 wired for 240	24
S =	240/480–220/440 wired for 480	24
T =	575/60	24
U =	277/60	24
V =	380/50	24
W =	415/50	24
X =	240/480/600 wired for 480	120
Y =	240/480/600 wired for 480	24
Z =	By description	—

Chart 3: Cover control—non-reversing ❷

A = None
B = Start/Stop pushbuttons
C = Start/Stop pushbuttons, run (R) pilot light
D = Start/Stop pushbuttons, run (R), Off (G) pilot lights
E = On/Off pushbuttons
F = On/Off pushbuttons, run (R) pilot light
G = On/Off pushbuttons, run (R), Off (G) pilot lights
H = Hand/Off/Auto selector switch
J = Hand/Off/Auto selector switch, run (R) pilot light
K = Hand/Off/Auto selector switch, run (R), Off (G) pilot lights
L = Start pushbutton
M = On pushbutton
N = Off pushbutton
P = Run-Red pilot light
Q = Off-Green pilot light
R = Run (R)–Off (G) pilot lights
S = Start/Stop selector switch
T = Start/Stop selector switch, run (R) pilot light
U = Start/Stop selector switch, run (R), Off (G) pilot lights
V = On/Off selector switch
W = On/Off selector switch, run (R) pilot light
X = On/Off selector switch, run (R), Off (G) pilot lights
Z = By description

Chart 4: Cover control—reversing K ❷

Use for Class 06, 10, 17, 20, 23, 26

A = None
B = Forward/Reverse/Stop pushbuttons
C = Forward/Reverse/Stop pushbuttons, 2 red pilot lights
D = Forward/Reverse/Stop pushbuttons, 2 red, 1 green pilot lights
E = Up/Stop/Down pushbuttons
F = Up/Stop/Down pushbuttons, 2 red pilot lights
H = Forward/Off/Reverse selector switch
J = Forward/Off/Reverse selector switch, 2 red pilot lights
K = Forward/Off/Reverse selector switch, 2 red, 1 green pilot lights
P = 2 red pilot lights
Q = 1 green pilot light
R = 2 red, 1 green pilot lights
V = Open/Off/Close selector switch
W = Open/Off/Close selector switch, 2 red pilot lights
X = Open/Off/Close selector switch, 2 red, 1 green pilot lights
Z = By description

❶ When control power transformer modification codes (CI–CII) are used or when starter class includes CPT, use chart 2 for system voltage code.

❷ Starters only—contactor cover control: use modification codes.

❸ SSOL for IEC available with non-combination starters only.

Chart 5: *XT* thermal overload relays

FLA Ratings	Size B–E 7–15 A	Size F–H 18–32 A	Size J–L 40–65 A	Size M–N 80–95 A	Size P–Q 115–150 A
0.1–0.16	A	A	—	—	—
0.16–0.24	B	B	—	—	—
0.24–0.4	C	C	—	—	—
0.4–0.6	D	D	—	—	—
0.6–1	E	E	—	—	—
1–1.6	F	F	—	—	—
1.6–2.4	G	G	—	—	—
2.4–4	H	H	—	—	—
4–6	I	I	—	—	—
6–10	J	J	J	—	—
9–12	K	—	—	—	—
12–16	L	L	L	—	—
16–24	—	M	M	—	—
24–32	—	N	—	—	—
24–40	—	—	P	—	—
25–35	—	—	—	S	S
35–50	—	—	—	T	T
40–57	—	—	Q	—	—
50–65	—	—	R	—	—
50–70	—	—	—	U	U
70–100	—	—	—	V	V
95–125	—	—	—	—	W
120–150	—	—	—	—	X

Chart 6: Modification codes—solid-state overload for NEMA (Freedom) and IEC (*XT*) starters

IEC size ❶	NEMA size	Full Load current adjustment range (A)	Three-Phase Without Ground Fault Auto/Manual Reset Overload	Three-phase with ground fault auto/manual reset overload
			Selectable class 10/20/30	Selectable class 10/20/30
B & C	00	1–5	R63/B	R64/B
		4–20	R63/C	R64/C
C & D	0 & 1	1–5	R63/B	R64/B
		4–20	R63/C	R64/C
		9–45	R63/D	R64/D
D	2	9–45	R63/D	R64/D
D, F & G	3	20–100	R63/E	R64/E
N/A	4	28–140	R63/F	R64/F
G	N/A	35–175	R63/F	R64/F
N/A	5	60–300	R63/G	R64/G
N/A	6	120–600	R63/H	R64/H

Chart 7: Typical examples of common modification codes

A1 = Ammeter, panel type wired to current transformer in line
A2 = Ammeter, panel type, selector switch and three current transformers wired to ammeter
A7 = Ammeters, (single-phase) total of three
A13 = Auxiliary contact, 1NO top mounted
A15 = Auxiliary contact, 1NO–1NC top mounted
A16 = Auxiliary contact, 2NO top mounted
A23 = Auxiliary contact, 2NO–2NC top mounted
A29 = Auxiliary contact, 1NO–1NC side mounted
A30 = 2NO auxiliary contacts
A31 = 2NC auxiliary contacts
A44 = Auxiliary contact, omitted
B1 = Breaker modifications, 1NO–1NC auxiliary contact on HMCP
B3 = Breaker modifications, shunt trip on circuit breaker, 48–127 Vac or Vdc
C1 = Control power transformer, standard size, 120 V/60 Hz secondary
C3 = Control power transformer, 100 VA extra capacity, 120 V/60 Hz secondary
C4 = Control power transformer, 100 VA extra capacity, 24 V/60 Hz secondary
C12 = 2P control relay
C35 = Control, wired for separate
C36 = Customer supplied material
C37 = Customer supplied drawings
D15 = HOA for each motor (duplex pumps)
E3 = Enclosure modifications, oversize enclosure
E11 = Safety door interlock enclosure assembly
G3 = Ground fault relay, unwired, installed
H5/D_ = Heater pack selections for NEMA Freedom thermal overload
L3 = Lightning arrester installed on panel
L10 = Carton label—order by description
L21 = 1NC power pole
L22 = 2NC power pole
L23 = 3NC power pole
L24 = 4NC power pole
L25 = 5NC power pole
L26 = 6NC power pole
L27 = 7NC power pole
L28 = 8NC power pole
N1 = Nameplate—order by description
P1 = Push-to-test pilot light (red RUN) wired to magnet coil
P2 = Push-to-test pilot light (green OFF) wired to magnet coil
P7 = Start/Stop pushbutton
P18 = Pushbutton with legend plate—order by description
P26 = Pilot light by description
P32 = Phase unbalance relay
P34 = Phase monitoring relay
S3 = Selector switch HOA
S18 = Selector switch, HIGH-LOW-OFF-AUTO
S29 = Single-phase starter (convert contactor/starter from three-phase to single-phase)
S40 = Selector switch—order by description
T6 = Solid-state on delay timer
T7 = Solid-state off delay timer
T15 = Customer-designated terminal points
Z90 = Customer specified modification