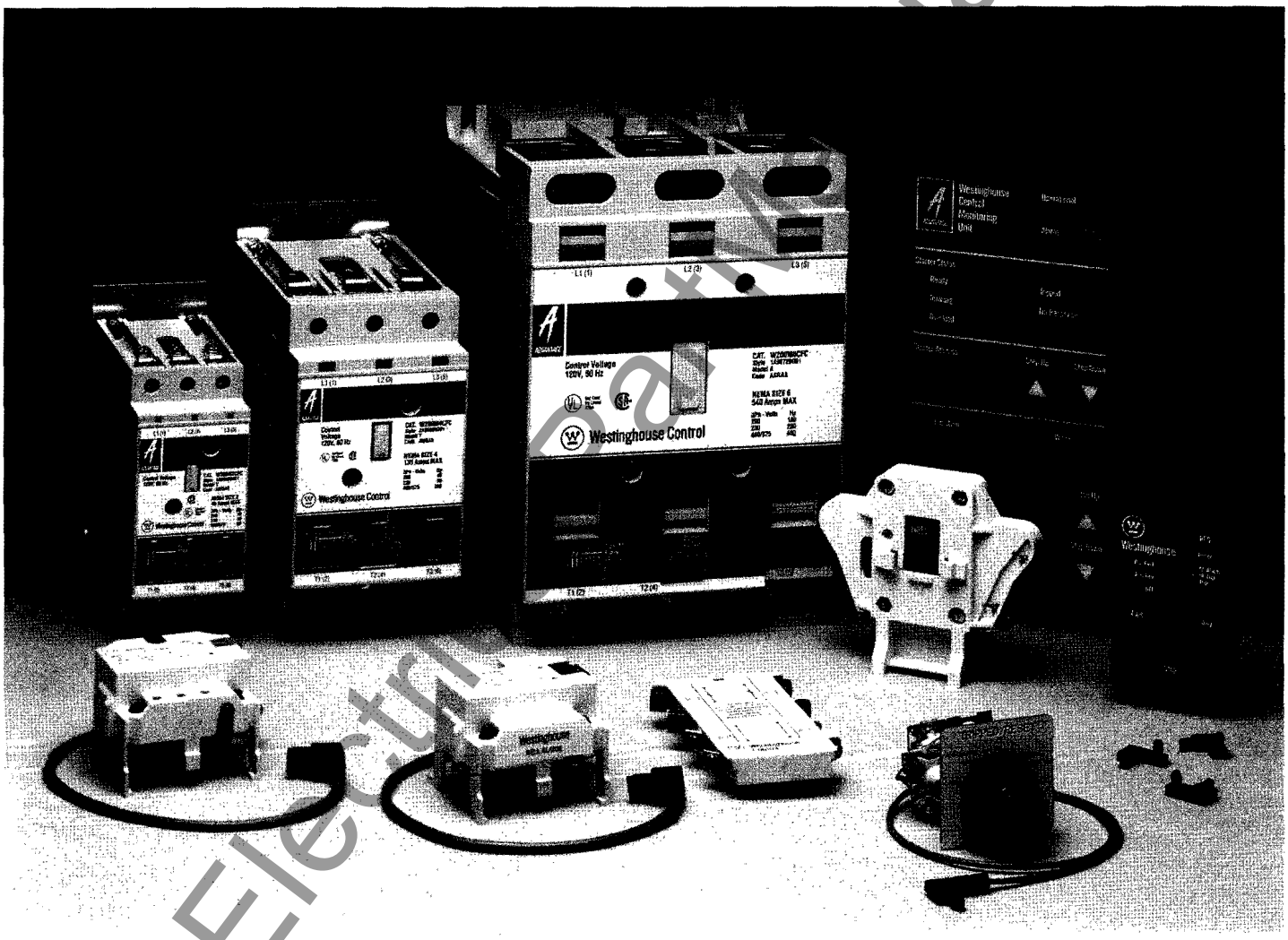
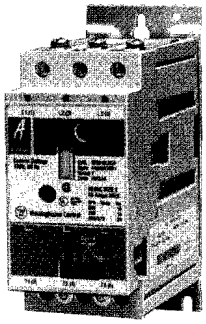
ADVANTAGE NEMA Rated Full-Voltage Magnetic Contactors and Starters



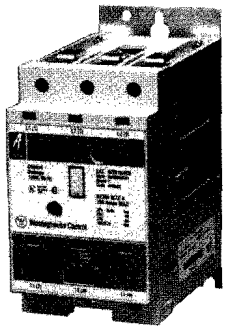
ADVANTAGE

ADVANTAGE Contactors and Starters

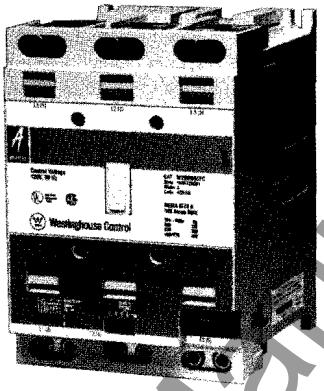
Full-Voltage, Three-Phase, 600 Volt AC
Nonreversing and Reversing, NEMA Sizes 1-6
Classes W201, W211, W251, W200, W210, W250



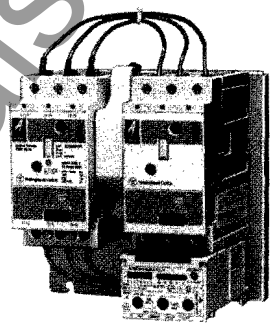
Sizes 1-2 Contactor



Sizes 3-4 Contactor



Sizes 5-6 Starter



Sizes 1-2 Horizontal Reversing Starter

Setting a New Standard in Motor Control
Revolutionary in design, Advantage motor starters employ state-of-the-art technology in solving motor control application problems that have existed for ages. Customer focus group input and 66,000 man-hours of engineering ingenuity have been combined to create a motor starter that dramatically extends operating life in a physical space requirement one half the size of conventional motor starters.

Offering motor overcurrent protection accurate to 2%, Advantage also maintains constant coil power regardless of varying control circuit conditions eliminating coil burnout, contact chatter, and welding due to low voltage or fluttering control signals.

Advantage is designed with a full compliment of features that make it the most versatile motor starter in the industry. Multifunction overload protection options provide application flexibility while reducing inventory. Communication capability extends benefits, allowing Advantage to be interactively linked to higher order control systems for monitoring, trouble shooting, and control.

Advantage is an engineering breakthrough that goes to work for you today. Technological advances such as pre-start diagnostics, increased accuracy, and the ability to communicate with other systems are benefits not realized in traditional motor starters.

The Advantage Breakthroughs
To achieve the level of benefits envisioned for Advantage controls at a competitive price, Westinghouse engineers discovered early in the development process that simply improving existing design concepts would fall short of the mark. A new approach involving a new level of technology was required. The result was the incorporation of three technical breakthroughs — a *new current sensor* monitoring current as opposed to heat, an *energy-balanced contact closure* increasing life by decreasing electrical and mechanical wear, and an *intelligent coil controller* optimizing the closing process based on varying control circuit conditions. Coordinating these breakthroughs to provide enhanced motor control performance is the Westinghouse SURE Chip.

The Patented Westinghouse SURE Chip Increases Life
Advantage uses the right combination of "brains" and "brawn" in effecting a motor start. The power circuit of the contactor employs heavy-duty silver alloy contacts that are scientifically designed for long life. The addition of a uniquely developed application specific microprocessor, called the SURE Chip, regulates power supplied to the operating coil. The regulated closing profile is tailored to existing control circuit conditions by the SURE Chip. This results in an energy-balanced system which reduces armature/magnet crash and contact bounce, extending mechanical and electrical life.

Improved Protection and Motor Utilization
The motor circuit monitoring and overload protection functions of Advantage starters are provided by three current sensors closely monitored by the SURE Chip. This sensor/microprocessor combination yields a protection scheme closely paralleling that of the motor heating damage boundary expressed in terms of current and time. Accurate to 2%, Advantage allows full utilization of motor capability without damage or nuisance tripping.

No Heaters, Smaller Size
Advantage starters eliminate the need for costly heater elements and installation expense. Standard overload protection functions include phase loss and unbalance protection, selectable trip class, automatic/manual reset and Class II ground fault protection — all conveniently packaged in a physical size 20% to 80% smaller than conventional devices. This size reduction, combined with reduced heat output, yields potential savings in enclosure costs.

In addition, Advantage was designed with fewer parts. That translates into simplified maintenance and minimal replacement parts inventories.

Built in Communications Capabilities Provide Two-Way Control
Advantage also offers low cost communication capability. On-off commands, status, and motor data can be linked to automated control systems without the addition of costly sensors, I/O modules, and transducers in a language compatible with many computer-based software systems in use on the industrial floor today.

Protected by 22 patents and proven in over two years of operating experience in harsh industrial applications, Advantage motor starters and contactors offer the user unprecedented value at a price competitive with traditional devices.

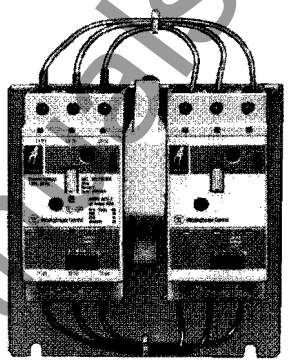
ADVANTAGE Contactors

Full-Voltage, Three-Phase, 600 Volt AC
Nonreversing and Reversing, NEMA Sizes 1-6
Classes W201, W211, W251

Sizes 3-4 Contactor

Features

- Smaller physical size
- Brownout protection
- Communications capability
- Minimized bounce times
- Higher contact force



Sizes 1-2 Reversing Contactor

Class W211 Reversing Contactors have their long axis horizontal
Class W251 Reversing Contactors have their long axis vertical

List Prices and Catalog Numbers, Wired for Separate Control

Max. HP	Motor Volts	NEMA Size	Cont. Amps Enclosed	Coil Volts	Coil Hz.	3 Poles Open (No Enclosure) W201 Cat. No.	List Price	3 x 3 Poles Horizontal Design W211 Cat. No.	List Price	3 x 3 Poles Vertical Design W251 Cat. No.	List Price
7½ 7½ 10 10	200 230 460 575	1	27	120 110	60 50	K1CF K1CN	$ 204	K1CF K1CN	$ 482	K1CF K1CN	$ 482
10 15 25 25	200 230 460 575	2	45	120 110	60 50	K2CF K2CN	372	K2CF K2CN	936	K2CF K2CN	936
25 30 50 50	200 230 460 575	3	90	120 110	60 50	K3CF K3CN	600	K3CF K3CN	1554	K3CF K3CN	1554
40 50 100 100	200 230 460 575	4	135	120 110	60 50	K4CF K4CN	1440	K4CF K4CN	3876	K4CF K4CN	3876
100 200 200	230 460 575	5	270	120 110	60 50	K5CF K5CN	3138	K5CF K5CN	7062	K5CF K5CN	7062
200 400 400	230 460 575	6	540	120 110	60 50	K6CF K6CN	8568	K6CF K6CN	17622	K6CF K6CN	17622

Ordering Information

Order by catalog number. Complete catalog number consists of **W201, W211, or W251** in bold type in catalog number column, plus suffix letters K1CF, etc. in catalog number column. Example: W201 + K1CF = W201K1CF

Further Information

Modification Kits, Accessories, pages 15-18
Dimensions, pages 4-6
Typical Wiring Diagrams, pages 7, 8
Technical Data, pages 20-22
Renewal Parts, page 19
IMPACC Communications, pages 23-28

Instruction Leaflets

Nonreversing	Reversing
Size 1 IL 17401	Size 1 IL 17402
Size 2 IL 17401	Size 2 IL 17402
Size 3 IL 17403	Size 3 IL 17404
Size 4 IL 17403	Size 4 IL 17404
Size 5 IL 17405	Size 5 IL 17406
Size 6 IL 17405	Size 6 IL 17406

ADVANTAGE Contactors

Full-Voltage, Three-Phase, 600 Volt AC
Nonreversing Contactors, NEMA Sizes 1-6
Class W201

Dimensions and Weights

Dimensions in inches *Not to be used for construction purposes unless approved.*
For metric dimensions (mm), multiply by 25.4 (1 in. = 25.4 mm)

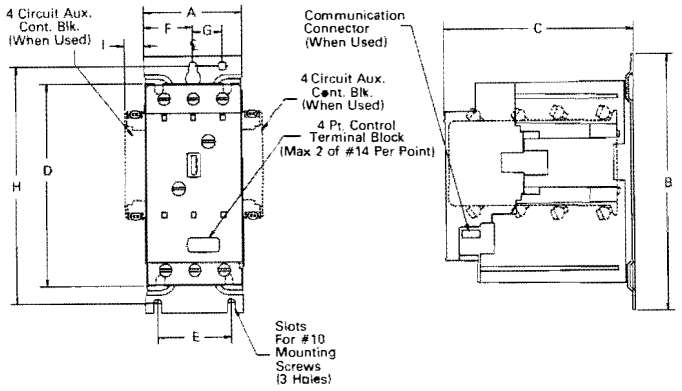


Figure 1
Sizes 1-2 Contactor

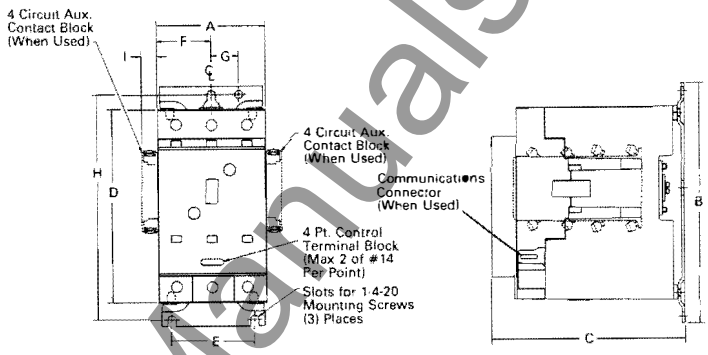


Figure 2
Sizes 3-4 Contactor

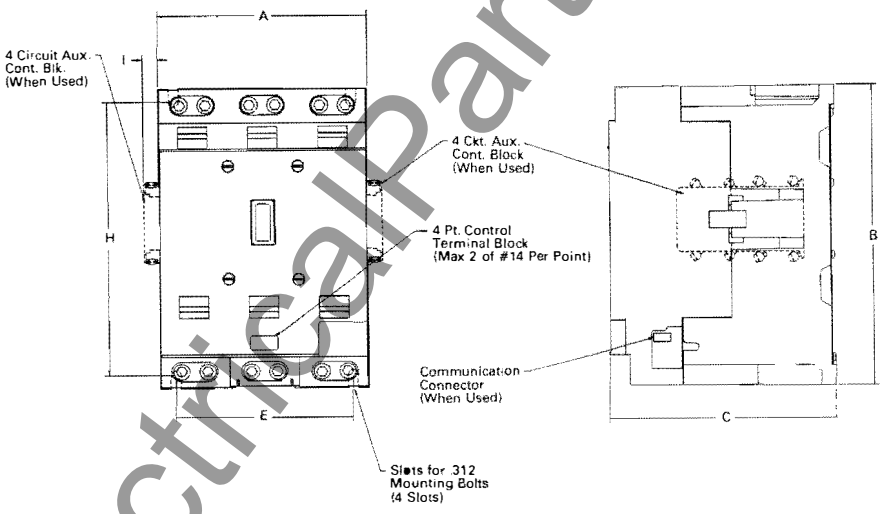


Figure 3
Sizes 5-6 Contactor

Nonreversing Contactors

NEMA Size	No. of Poles	Fig. No.	Mounting Screws		Dimensions, Inches									Weight Lbs.
			No.	Size	A	B	C	D	E	F	G	H	I	
1, 2	3	1	3	#10	2.50	6.50	4.84	5.12	1.88	1.25	0.75	6.00	0.52	2.00
3, 4	3	2	3	¼-20	3.68	8.00	6.49	6.45	2.80	1.84	0.93	7.50	0.52	6.00
5, 6	3	3	4	.312	7.07	10.08	7.64	—	6.00	—	—	9.20	0.50	30.00

ADVANTAGE Contactors

Full-Voltage, Three-Phase, 600 Volt AC
Horizontal Reversing Contactors, NEMA Sizes 1-6, 3 x 3 Poles
Class W211

Dimensions and Weights

Dimensions in inches *Not be used for construction purposes unless approved.*
For metric dimensions (mm), multiply by 25.4 (1 in. = 25.4 mm)

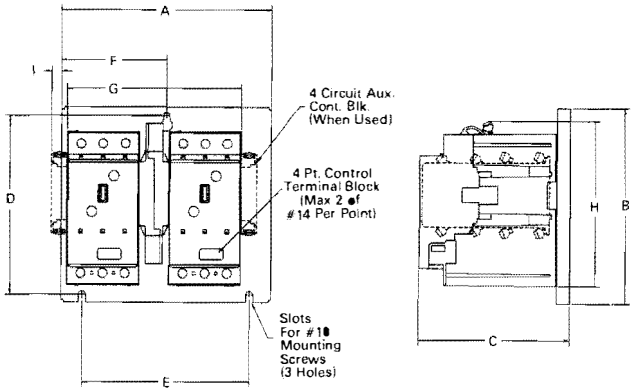


Figure 1
Sizes 1-2 Horizontal

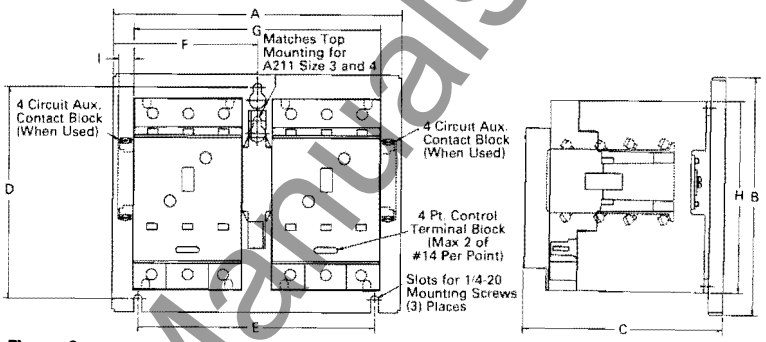


Figure 2
Sizes 3-4 Horizontal

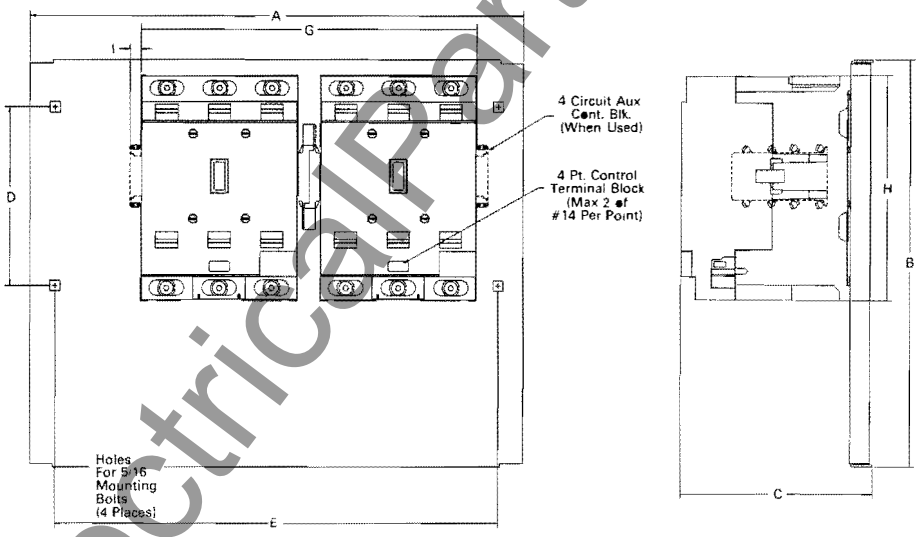


Figure 3
Sizes 5-6 Horizontal

Horizontal Reversing Contactors

NEMA Size	No. of Poles	Fig. No.	Mounting Screws		Dimensions, Inches									Weight Lbs.
			No.	Size	A	B	C	D	E	F	G	H	I	
1, 2	3 x 3 Horiz.	1	3	#10	7.13	6.55	5.09	6.00	5.69	3.56	5.93	5.53	0.33	6.00
3, 4	3 x 3 Horiz.	2	3	1/4-20	9.76	8.00	6.76	7.12	8.00	4.88	8.34	6.45	0.52	16.00
5, 6	3 x 3 Horiz.	3	4	5/16	22.24	18.24	8.64	8.00	20.00	—	15.15	10.08	0.50	80.00

ADVANTAGE Contactors

Full-Voltage, Three-Phase, 600 Volt AC
Vertical Reversing Contactors, NEMA Sizes 1-6, 3 x 3 Poles
Class W251

Dimensions and Weights

Dimensions in inches *Not be used for construction purposes unless approved.*
For metric dimensions (mm), multiply by 25.4 (1 in. = 25.4 mm)

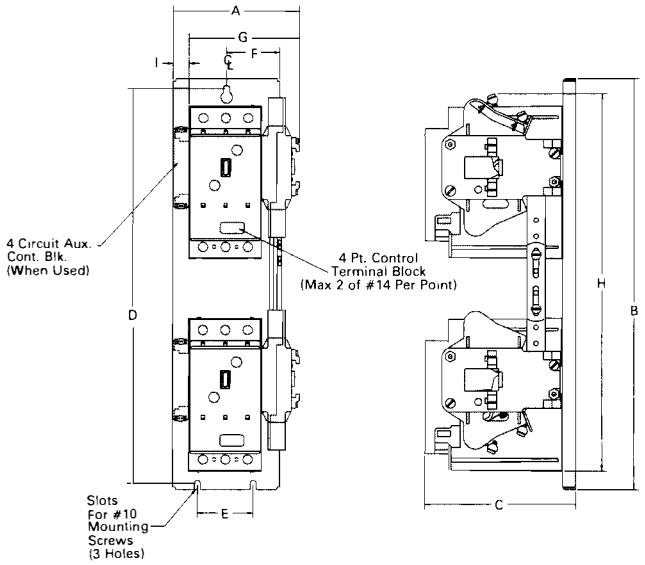


Figure 1
Sizes 1-2 Vertical

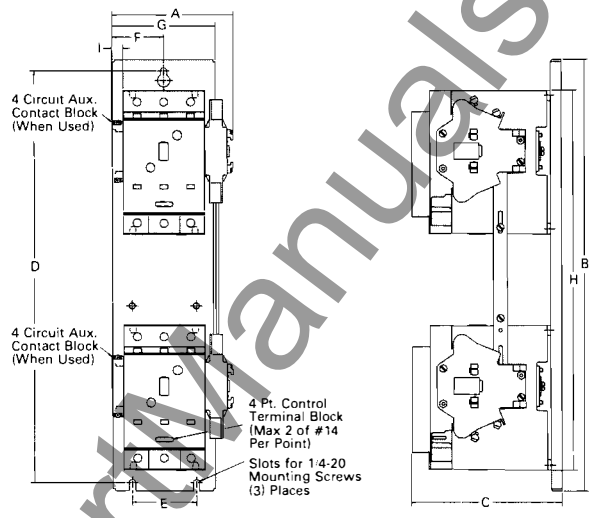


Figure 2
Sizes 3-4 Vertical

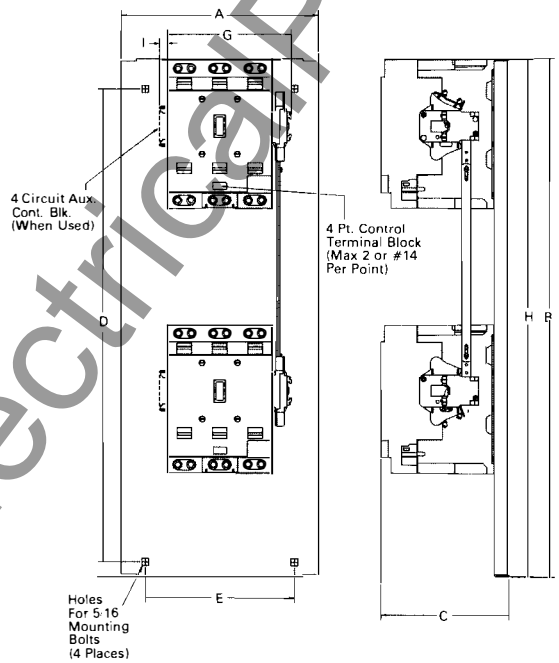


Figure 3
Sizes 5-6 Vertical

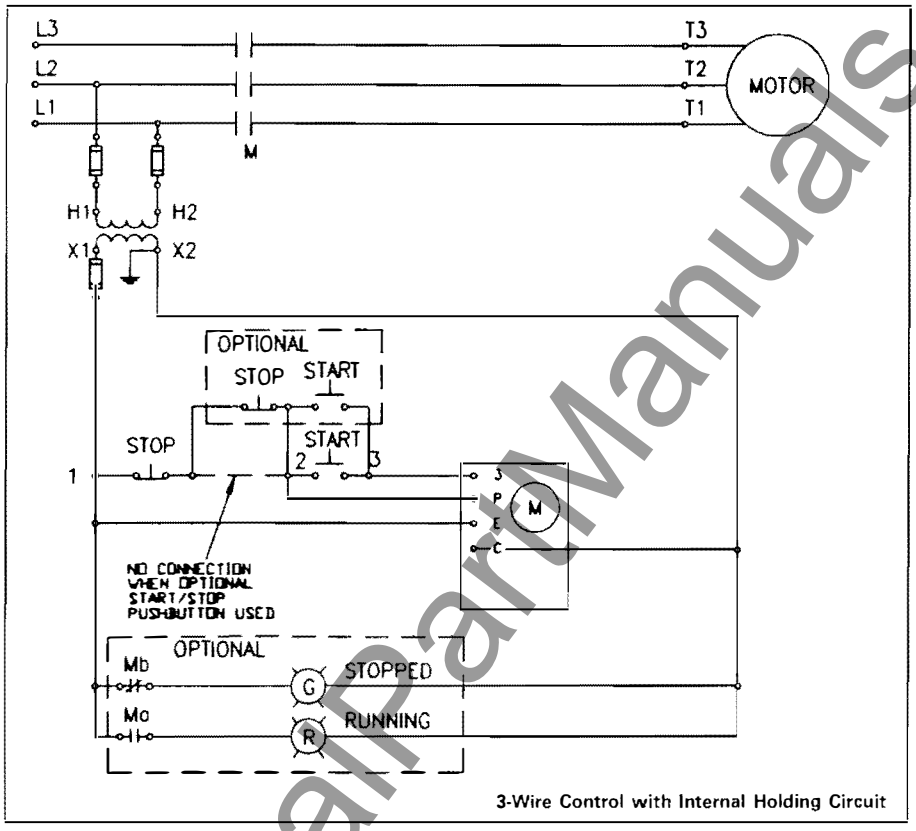
Vertical Reversing Contactors

NEMA Size	No. of Poles	Fig. No.	Mounting Screws		Dimensions, Inches									Weight Lbs.
			No.	Size	A	B	C	D	E	F	G	H	I	
1, 2	3 x 3 Vert.	1	3	#10	4.27	13.78	5.09	13.25	1.88	1.80	3.73	12.65	0.52	7.00
3, 4	3 x 3 Vert.	2	3	1/4-20	5.42	19.25	6.76	18.38	2.88	2.31	4.62	16.94	0.52	17.00
5, 6	3 x 3 Vert.	3	4	5/16	13.24	34.94	8.64	32.00	10.00	—	8.39	34.87	0.50	80.00

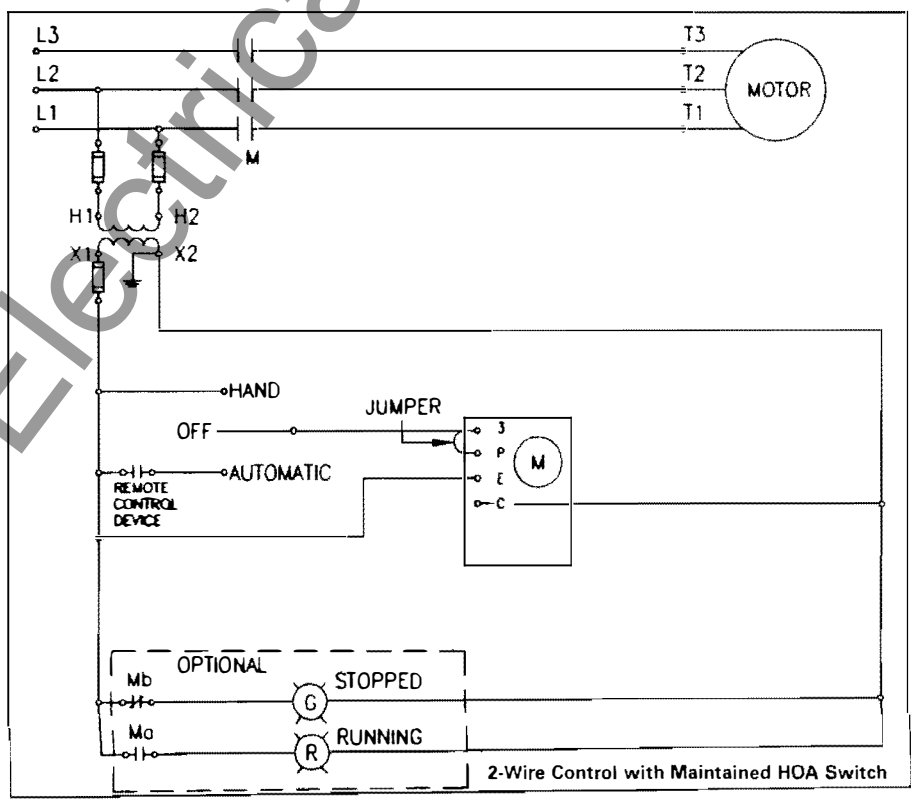
ADVANTAGE Contactors

Full-Voltage, Three-Phase, 600 Volt AC
Nonreversing Contactors, NEMA Sizes 1-6
Class W201

Typical Wiring Diagrams



3-Wire Control with Internal Holding Circuit

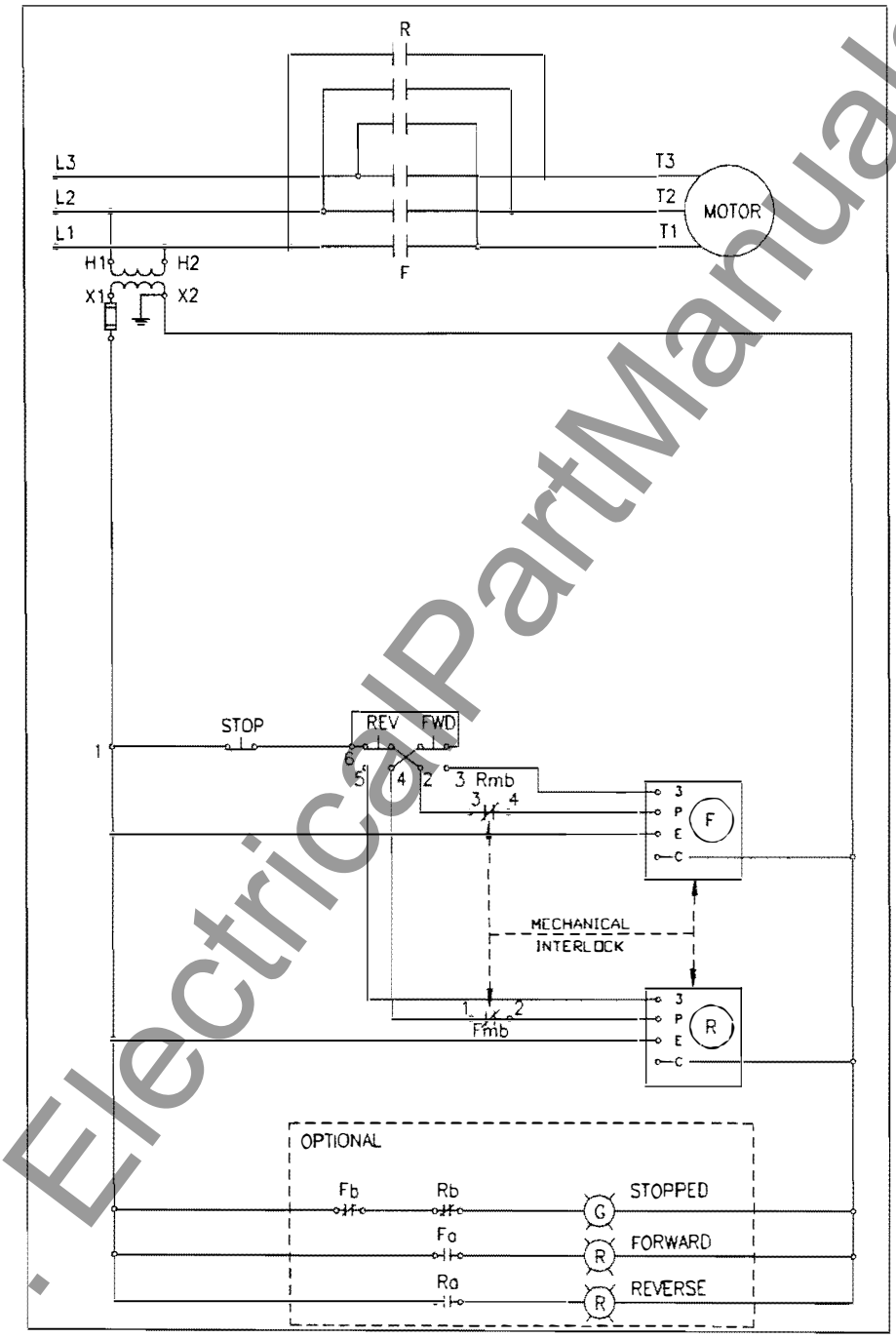


2-Wire Control with Maintained HOA Switch

ADVANTAGE Contactors

Full-Voltage, Three-Phase, 600 Volt AC
Reversing Contactors, NEMA Sizes 1-6, 3 x 3 Poles
Classes W211, W251

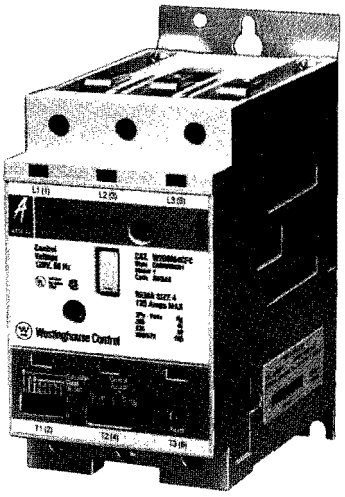
Typical Wiring Diagrams



3-Wire Control with Internal Holding Circuit

ADVANTAGE Starters

Full-Voltage, Three-Phase, 600 Volt AC
Nonreversing, NEMA Sizes 1-6
Classes W200, W210, W250



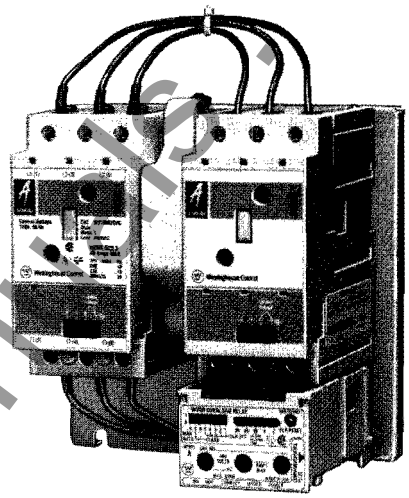
Sizes 3-4 Starter

Features

Starter
- Smaller physical size
- Brownout protection
- Communications capability
- Minimized bounce times
- Higher contact force
- Common auxiliary contacts

Motor Protection
- Heaters not required – selectable settings
- Overload protection – accuracy 2%
- Phase loss and phase unbalance protection
- Class II ground-fault protection

Selectable Overload Protection Settings
- Selectable automatic/manual reset
- Selectable trip class 10, 20, 30 or no protection (disables overload)
- Selectable trip rating (full load amps)



Sizes 1-2 Horizontal Reversing Starter

Class W211 Reversing Contactors have their long axis horizontal
Class W251 Reversing Contactors have their long axis vertical

List Prices and Catalog Numbers, Wired for Separate Control, Heaters Not Required

Max. HP	Motor Volts	NEMA Size	Cont. Amps Enclosed	Coil Volts	Coil Hz.	Open (No Enclosure) Cat. No.	List Price	Horizontal Design Cat. No.	List Price	Vertical Design Cat. No.	List Price
						W200		W210		W250	
1 1 2 2	200 230 460 575	1①② 0.47-3.81 FLA ¼-2 HP at 460 V	27	120 110	60 50	MLCF MLCN	$ 261	MLCF MLCN	$ 549	MLCF MLCN	$ 549
7½ 7½ 10 10	200 230 460 575	1	27	120 110	60 50	M1CF M1CN	261	M1CF M1CN	549	M1CF M1CN	549
10 15 25 25	200 230 460 575	2	45	120 110	60 50	M2CF M2CN	453	M2CF M2CN	1017	M2CF M2CN	1017
25 30 50 50	200 230 460 575	3	90	120 110	60 50	M3CF M3CN	717	M3CF M3CN	1671	M3CF M3CN	1671
40 50 100 100	200 230 460 575	4	135	120 110	60 50	M4CF M4CN	1605	M4CF M4CN	4041	M4CF M4CN	4041
75 100 200 200	200 230 460 575	5	270	120 110	60 50	M5CF M5CN	3882	M5CF M5CN	7812	M5CF M5CN	7812
150 400 400 400	200 230 460 575	6	540	120 110	60 50	M6CF M6CN	9192	M6CF M6CN	18228	M6CF M6CN	18228

NEMA Size	Motor FLA Current Ranges 1.15 to 1.25 S.F.	1.0 S.F.
1①②	0.47 - 3.81	0.51 - 4.14
1	3.15 - 27.00	3.43 - 27.00
2	3.15 - 45.00	3.43 - 45.00
3	9.90 - 90.00	10.80 - 90.00
4	9.90 - 135.00	10.80 - 135.00
5	38.30 - 270.00	41.70 - 270.00
6	38.30 - 540.00	41.70 - 540.00

Option Information

Description	Cat. No. Suffix
Omit Class II Ground-Fault Protection	Y7
Omit Phase-Loss Protection	Y4

Order by Catalog Number.
Add suffix
Example: W200 + M1CFC + Y4 = W200M1CFCY4

Ordering Information

Order by catalog number. Complete catalog number consists of **W200, W210, or W250** in bold type in catalog number column, plus suffix letters M1CFC, etc. in catalog number column. Example: W200 + M1CFC = W200M1CFC

① For Motor FLA current range of 0.47A thru 3.81A with a 1.15 to 1.25 S.F.
② For motor HP range of ¼ HP to 2 HP at 460V.

Further Information

Modification Kits, Accessories, pages 15-18
Dimensions, pages 10-12
Typical Wiring Diagrams, pages 13, 14
Technical Data, pages 20-22
Renewal Parts, page 19
IMPACC Communications, pages 23-28

Instruction Leaflets

Nonreversing	Reversing
Size 1 IL 17401	Size 1 IL 17402
Size 2 IL 17401	Size 2 IL 17402
Size 3 IL 17403	Size 3 IL 17404
Size 4 IL 17403	Size 4 IL 17404
Size 5 IL 17405	Size 5 IL 17406
Size 6 IL 17405	Size 6 IL 17406

ADVANTAGE Starters

Full-Voltage, Three-Phase, 600 Volt AC
Nonreversing Starters, NEMA Sizes 1-6
Class W200

Dimensions and Weights

Dimensions in Inches *Not to be used for construction purposes unless approved.*
For metric dimensions (mm), multiply by 25.4 (1 in. = 25.4 mm)

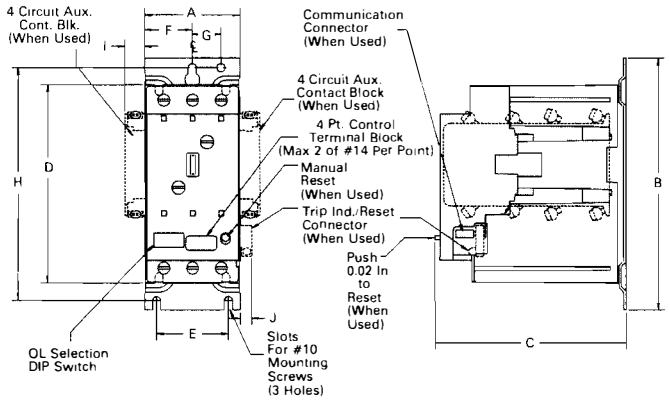


Figure 1
Sizes 1-2 Starter

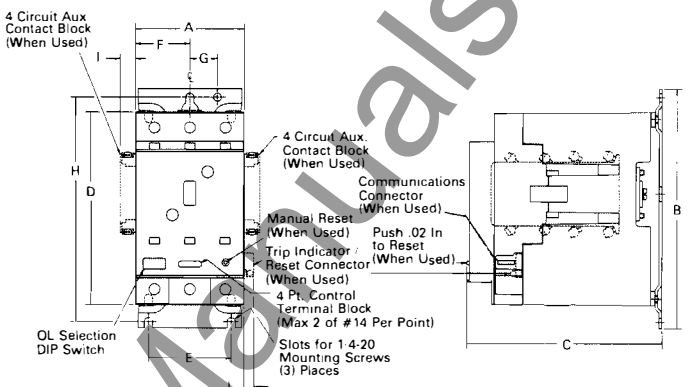


Figure 2
Sizes 3-4 Starter

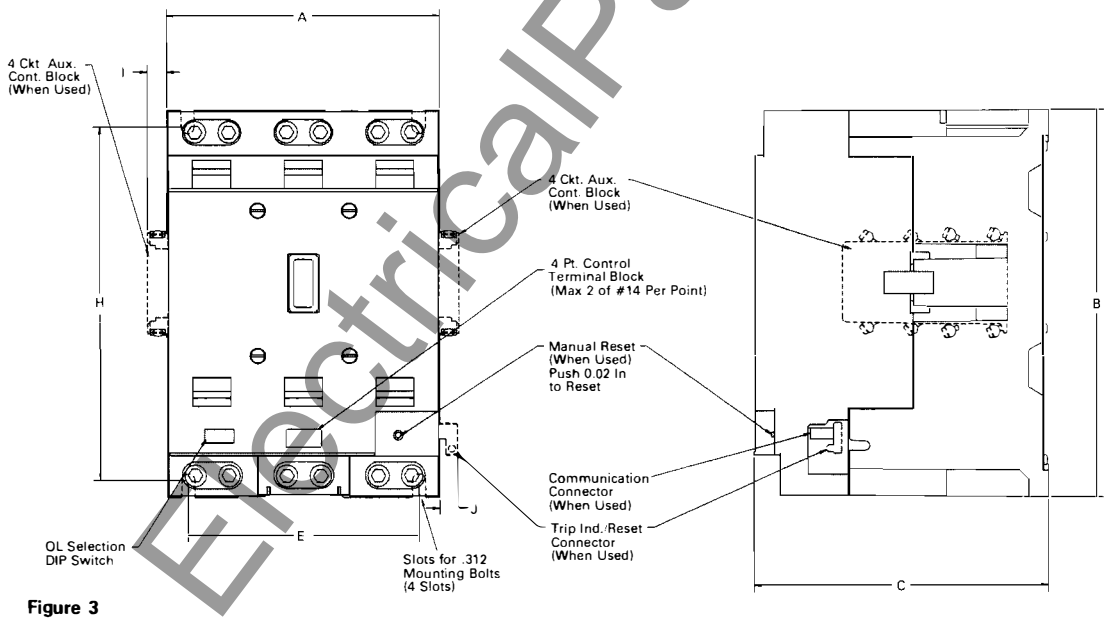


Figure 3
Sizes 5-6 Starter

Nonreversing Starters

NEMA Size	No. of Poles	Fig. No.	Mounting Screws		Dimensions, Inches										Weight Lbs.
			No.	Size	A	B	C	D	E	F	G	H	I	J	
1, 2	3	1	3	#10	2.50	6.50	4.96	5.12	1.88	1.25	0.75	6.00	0.52	0.29	2.00
3, 4	3	2	3	¼-20	3.68	8.00	6.54	6.45	2.80	1.84	0.93	7.50	0.52	0.32	6.00
5, 6	3	3	4	.312	7.07	10.08	7.64	—	6.00	—	—	9.20	0.50	0.46	30.00

ADVANTAGE Starters

Full-Voltage, Three-Phase, 600 Volt AC
Reversing Open Starters, NEMA Sizes 1-6
Class W210

Dimensions and Weights

Dimensions in Inches *Not to be used for construction purposes unless approved.*
For metric dimensions (mm), multiply by 25.4 (1 in. = 25.4 mm)

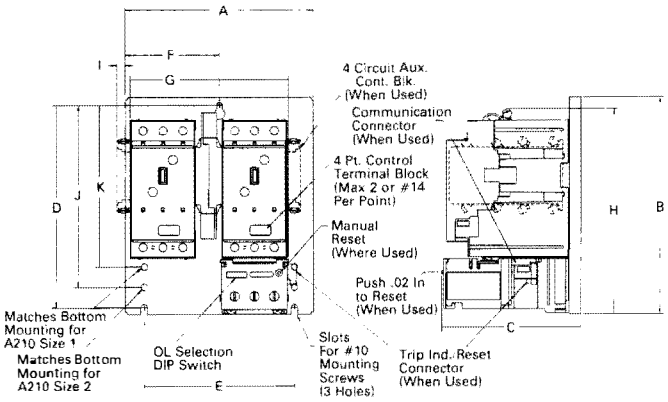


Figure 1
Sizes 1-2 Horizontal

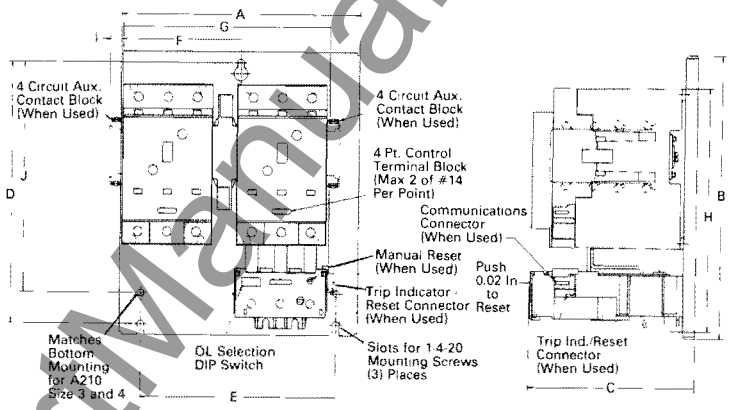


Figure 3
Sizes 3-4 Horizontal

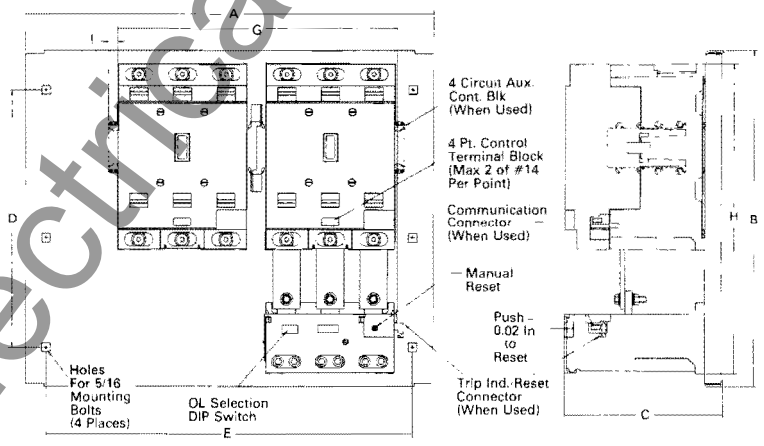


Figure 5
Sizes 5-6 Horizontal

Horizontal Reversing Starters

NEMA Size	No. of Poles	Fig. No.	Mounting Screws		Dimensions, Inches											Weight Lbs.
			No.	Size	A	B	C	D	E	F	G	H	I	J	K	
1, 2	3 x 3 Horiz.	1	3	#10	7.13	8.05	5.25	7.50	5.69	3.56	6.00	7.62	0.33	6.75	6.00	7.00
3, 4	3 x 3 Horiz.	2	3	1/4-20	9.76	11.37	6.81	10.50	8.00	4.88	8.47	9.79	0.45	9.25	—	18.00
5, 6	3 x 3 Horiz.	3	4	5/16	22.24	18.24	8.64	14.00	20.00	—	15.28	16.82	0.50	—	—	85.00

ADVANTAGE Starters

Full-Voltage, Three-Phase, 600 Volt AC
Reversing Open Starters, NEMA Sizes 1-6
Class W250

Dimensions and Weights

Dimensions in Inches *Not to be used for construction purposes unless approved.*
For metric dimensions (mm), multiply by 25.4 (1 in. = 25.4 mm)

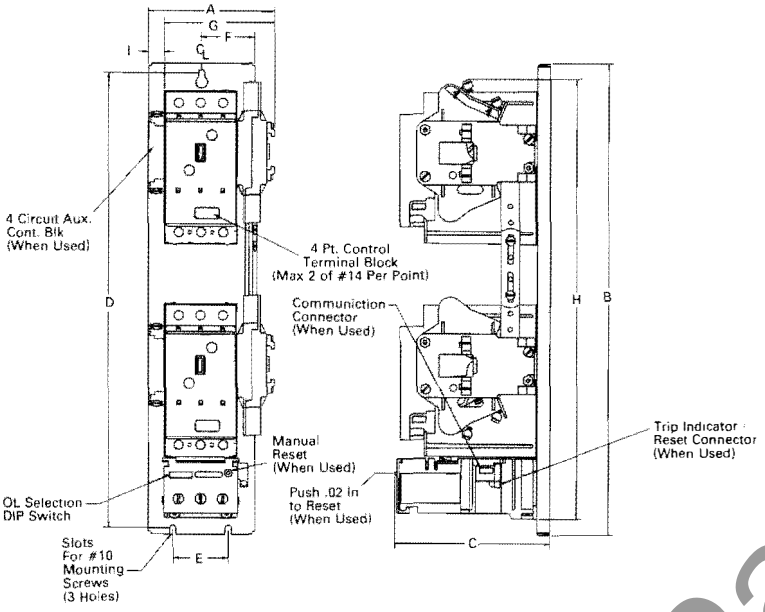


Figure 1
Sizes 1-2 Vertical

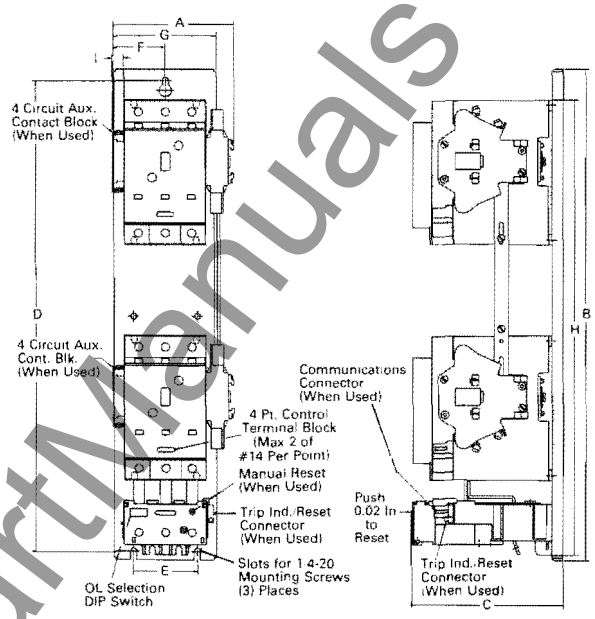


Figure 2
Sizes 3-4 Vertical

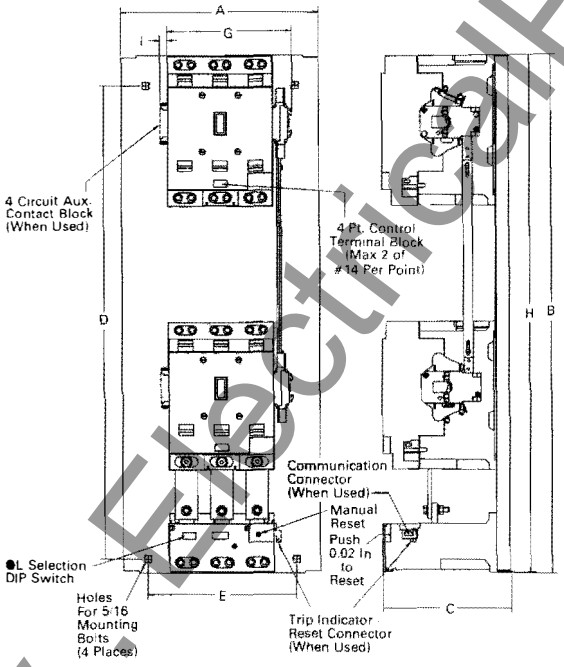


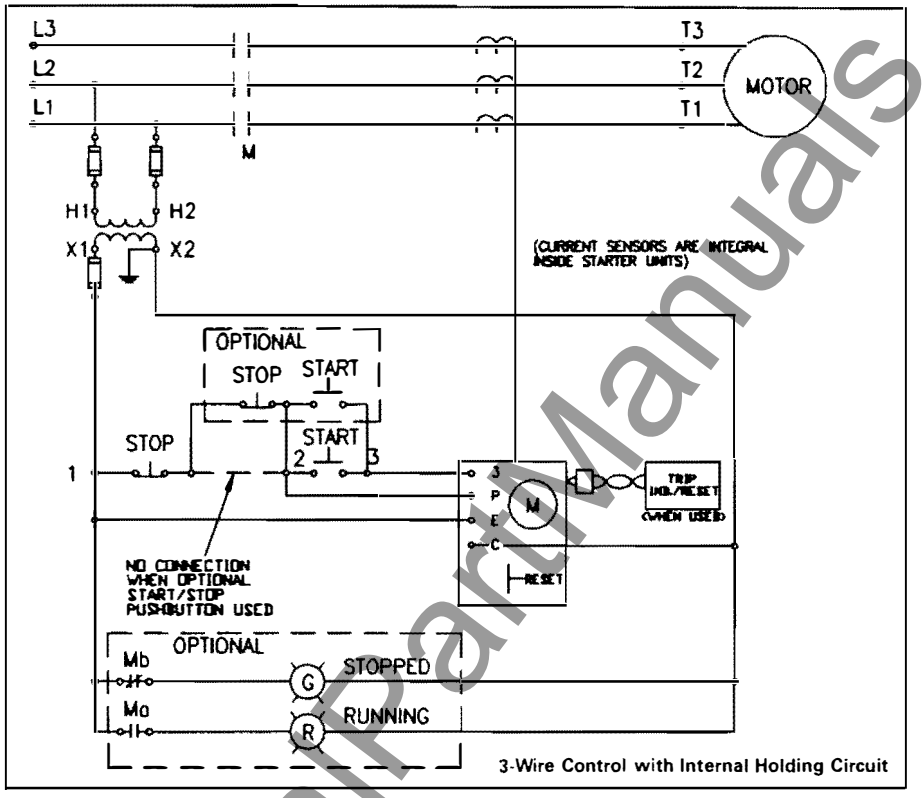
Figure 3
Sizes 5-6 Vertical

Vertical Reversing Starters

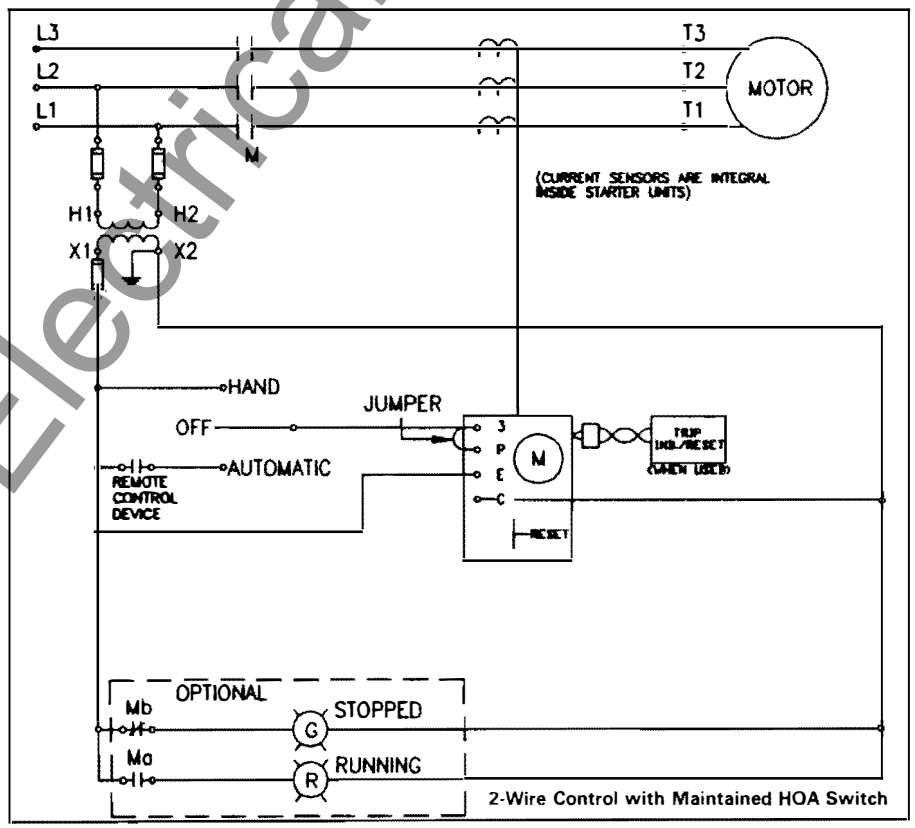
NEMA Size	No. of Poles	Fig. No.	Mounting Screws		Dimensions, Inches									Weight Lbs.
			No.	Size	A	B	C	D	E	F	G	H	I	
1, 2	3 x 3 Vert.	1	3	#10	4.27	15.53	5.25	15.00	1.88	1.80	3.73	14.72	0.52	7.50
3, 4	3 x 3 Vert.	2	3	1/4-20	5.42	21.88	6.81	21.00	2.88	2.31	4.62	20.28	0.52	19.00
5, 6	3 x 3 Vert.	3	4	5/16	13.24	34.94	8.64	32.00	10.00	—	8.39	34.87	0.50	85.00

ADVANTAGE Starters
Full-Voltage, Three-Phase, 600 Volt AC
Nonreversing Starters, NEMA Sizes 1-6
Class W200

Typical Wiring Diagrams



3-Wire Control with Internal Holding Circuit

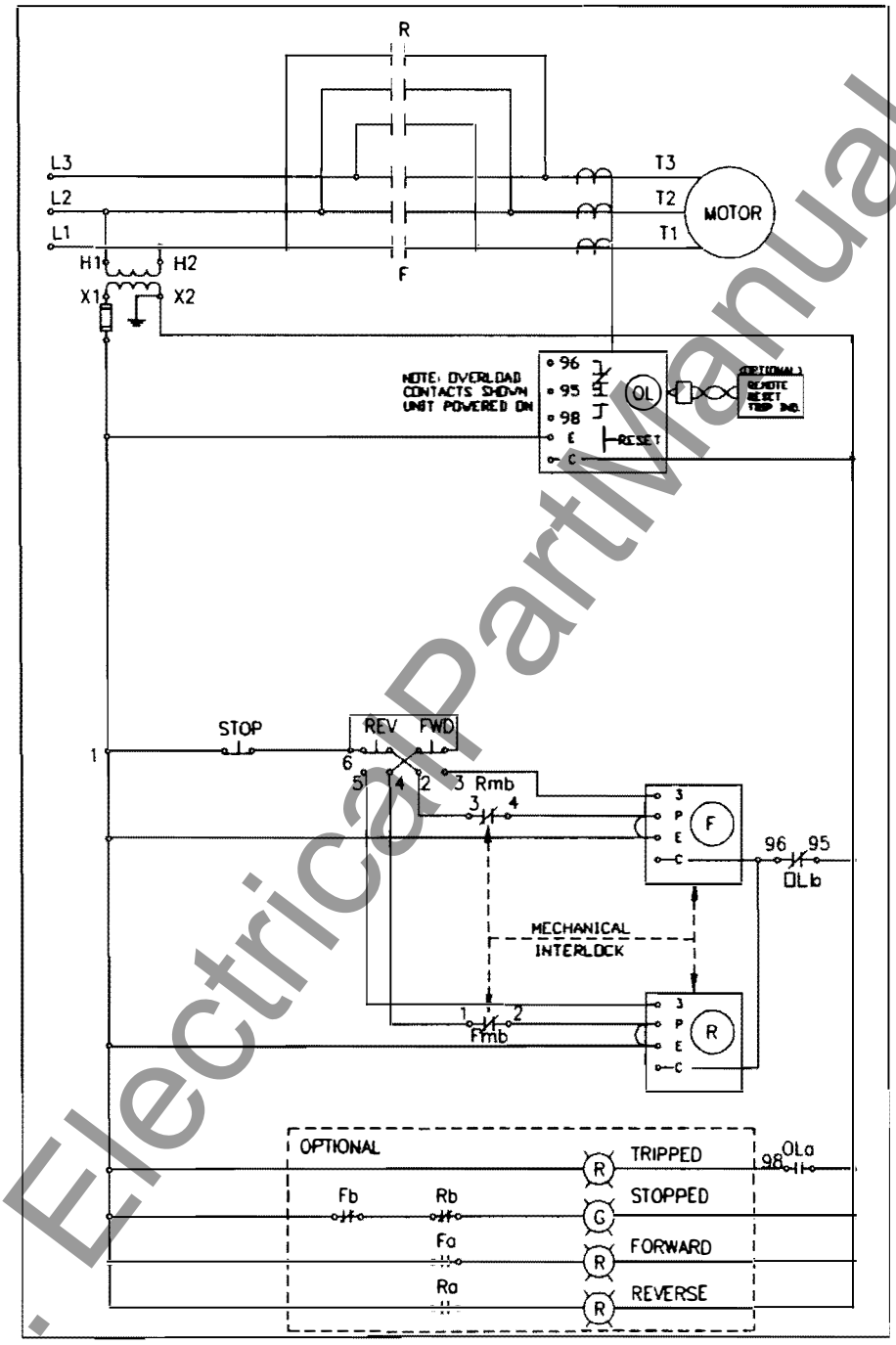


2-Wire Control with Maintained HOA Switch

ADVANTAGE Starters

Full-Voltage, Three-Phase, 600 Volt AC
Reversing Starters, NEMA Sizes 1-6
Classes W210, W250

Typical Wiring Diagrams



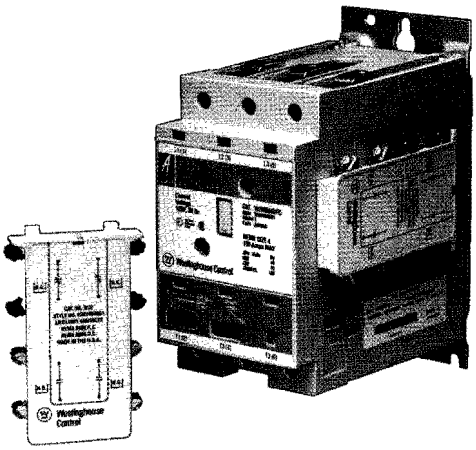
3-Wire Control with Internal Holding Circuit

ADVANTAGE Contactors and Starters

Nonreversing and Reversing, NEMA Sizes 1-6
Classes W200, W201, W210, W211, W251

Accessories and Field Modification Kits

Type W Auxiliary Contacts



- Provides four separate contact sets which wire vertically and are color coded; black designates NC and silver designates NO
- Up to two auxiliary contacts can be mounted for a total of up to eight contact sets
- Provides circuit isolation (no polarity restrictions) and single break indicated contacts
- Common design fits all sizes 1-6

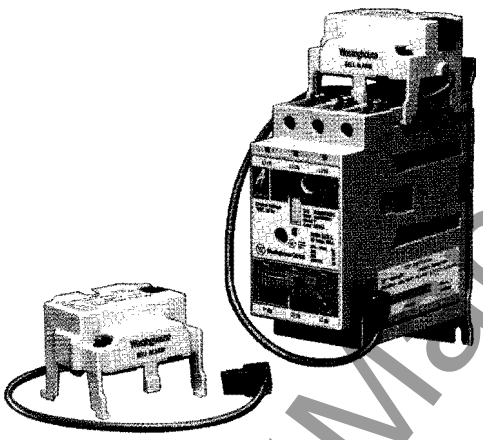
Auxiliary Contact Ratings

Voltage	Make	Break
NEMA A600		
120-600 VAC	7200 VA	720 VA
NEMA Q300		
125-300 VDC	69 VA	69 VA

Auxiliary Contact Types

Catalog Number	Contact Type	List Price
W22	2 NO, 2 NC	**$96**
W31	3 NO, 1 NC	**96**
W40	4 NO, 0 NC	**96**
W04	0 NO, 4 NC	**96**
W13	1 NO, 3 NC	**96**
W11T	1 NO, 1 NC & 2 tie points	**96**

Bell Alarm Module



- Simple snap-on mounting – see mounting examples below
- Form C NO/NC contact

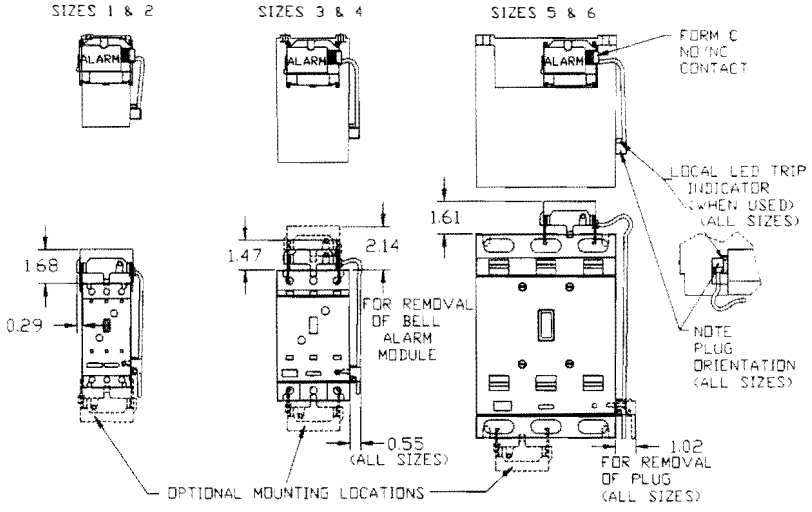
Catalog Number	List Price
WBNOC	**$34**

Control Contact Ratings

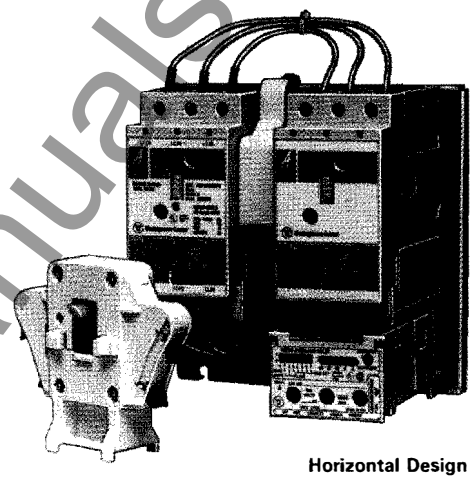
AC Volts	Maximum Amperes	
	Make	Break
120	2880 VA	480 VA
Continuous Current Rating: 5 Amperes		

- If Bell Alarm Module is used, IMPACC Communications is unavailable

Mounting – Bell Alarm Module



Mechanical Interlock



Horizontal Design

- Prevents closing of one member of a reversing or multi-speed contactor until the opposite member is completely open
- Lever type mechanism assures positive action
- Electrical interlocking capability – two NC contacts
- NOTE – for reversing contactor factory or field assembly and reversing starter factory assembly only – reversing starters cannot be field assembled.

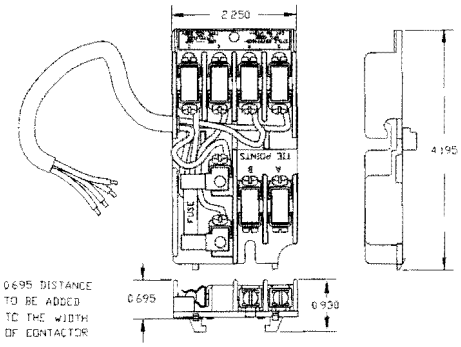
Contactor Arrangement No. of Poles, Horiz. or Vertical	Cat. No.	Rev. Size	List Price
3 x 3 Horizontal	WM16H	1-6	**$ 36**
3 x 3 Vertical	WM12V	1, 2	**36**
3 x 3 Vertical	WM34V	3, 4	**60**
3 x 3 Vertical	WM05V	5	**324**
3 x 3 Vertical	WM06V	6	**324**

ADVANTAGE Contactors and Starters

Nonreversing and Reversing, NEMA Sizes 1-6
Classes W200, W201, W210, W211, W250, W251

Accessories and Field Modification Kits, *Continued*

Control Wire Ring/Spade Terminal Block

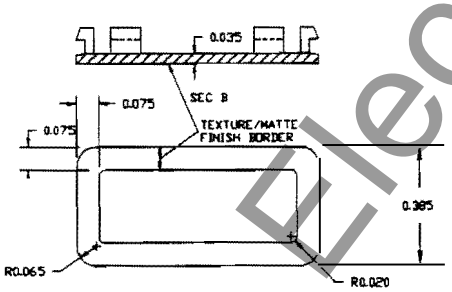


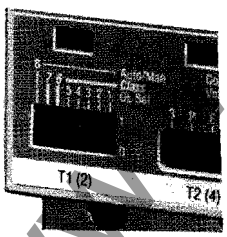
- Provisions for ring or spade type terminals
- Bottom side pre-wired with color-coded conductors
- Fused or non-fused
- Side mounting on contactor identical to Type W aux. contacts mounting or can be mounted on Type W aux. contacts

Cat. No.	Type	List Price
WTB16	Non-fused 1-6	**$36**
WTBF12	Fused 1, 2	**60**
WTBF34	Fused 3, 4	**60**
WTBF56	Fused 5, 6	**60**

OL Selection DIP Switch Window

- Simple snap-in installation
- Allows clear visibility of DIP switches
- Prevents unwanted tampering of DIP switch settings
- Once in must be pried out from rear
- One supplied with each starter





Package of 10

Cat. No.	List Price
WDIPSW10	**$19**

Internal Trip Indicator

- OL alarm indication – indicated by blinking light
- Trip indication – indicated by solid light

Cat. No.	List Price
WLED	**$9**

Competitive Baseplate

- Allows for direct retrofit of competitive nonreversing starters
- Eliminates the need for re-drilling and tapping mounting holes
- Simple selection of competitive footprints

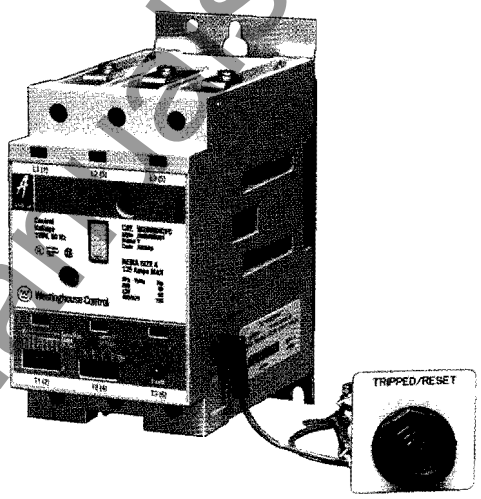
Cat. No.	Size	List Price
WBASE1	1	**$26**
WBASE2	2	**26**
WBASE3	3	**26**
WBASE4	4	**26**

DIN Rail Adapter Kit

- Provides mounting on 35 mm DIN rail
- For use with sizes 1 and 2 nonreversing contactors and starters

Cat. No.	List Price
WDIN	**$15**

Remote Reset and Trip Indicator

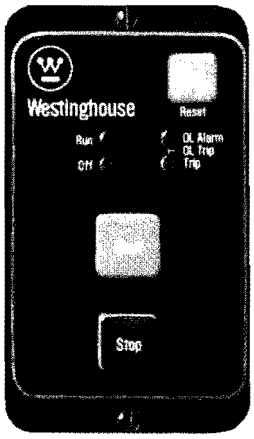


- OL alarm indication
- Trip indication
- OL reset capability
- PB2 30 mm
- NEMA 4 oiltight rated
- Mount remotely up to 6 ft. away
- Unit completely assembled including legend plate
- Available also in reset only form – no trip indication

Cat. No.	Type	List Price
WRSKL24	Reset w/trip indication – 2 ft. cord	**$68**
WRSKL72	Reset w/trip indication – 6 ft. cord	**70**
WRSK24	Reset only – 2 ft. cord	**27**
WRSK72	Reset only – 6 ft. cord	**29**
WRLK	Conversion kit – reset only to reset w/trip indication	**48**
WRC72	6 ft. cord	**9**
WRLT	LED replacement bulb	**18**

ADVANTAGE Control Modules

Accessories and Field Modification Kits, *Continued*



Full-Voltage Pushbutton Control Shown

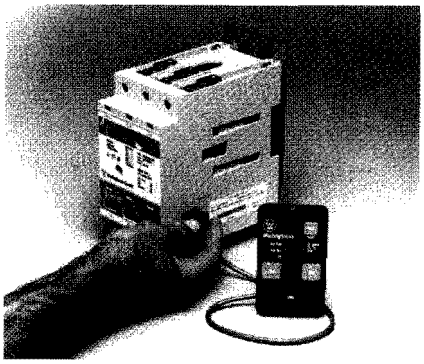


Fig. 1 Simple Single Plug-in Wiring

Description
The Advantage Control Modules (ACM) provide a cost-effective alternative to pushbuttons, indicating lights, reset mechanisms, bell alarms, and panel meters when used with the Advantage product line. Typical input/output control functions traditionally provided by panel-mounted devices are conveniently packaged in a series of modules depending on application and complexity.

Fourteen styles cover applications ranging from:

- Full-Voltage Nonreversing
- Reversing
- Multi-Speed
- Reduced Voltage

Modules exists in each application to address the functions of:

- Status Only
  - Indicating Lights
  - Reset
- Status, Start/Stop, and Reset
- Status, HOA, and Reset
- Status, Start/Stop/HOA, and Reset

An additional module, the Metering Module, replaces conventional ammeters (three-phase), reset mechanisms, and displays trip cause and data, control voltage, and status.

The Metering Module can be used by itself or in conjunction with any of the ACM's. An extra plug connection is available on the rear of the ACM that accepts the Metering Module input.

The ACM family has been designed to save:

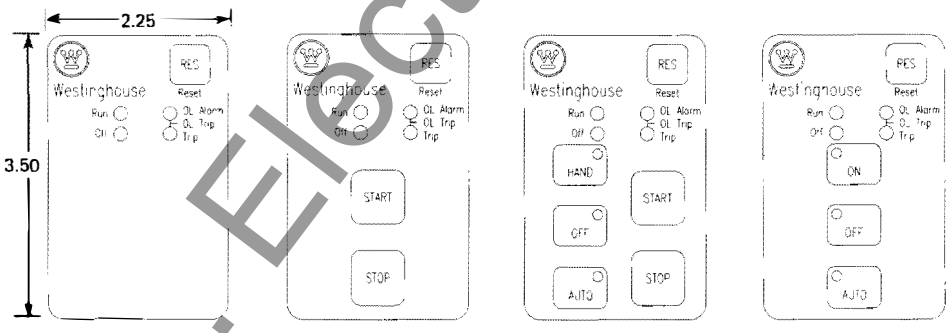
- Panel space (versus conventional pushbuttons and indicating lights)
- Mounting and assembly labor
- Wiring and installation time

Regardless of the configuration, installation requires mounting only one 2.25 x 3.50 inch module, substantially reducing space requirements. Available as a standard Greenlee punch and die set, Greenlee #50600710, mounting dimensions save valuable space, and installation is accomplished with only two screws.

ACM's provide savings in wiring as well. Regardless of the complexity of the application, wiring expense is reduced to a single plug-in cable, see figure 1.

IMPACC communications is not precluded by use of the Advantage Control Modules. An extra plug connection is available on the rear of the ACM or Metering Module to allow the Advantage PONI card to be plugged in.

Full-Voltage and Reduced Voltage Control Modules



Status Only | **Pushbutton Control** | **Hand-Off-Auto Control with Start-Stop Pushbutton Control in Hand Mode** | **Hand-Off-Auto Control**

Status Only:
- 4 LED's which indicate that the motor is OFF, RUNNING, TRIPPED or in ALARM mode (motor current is above 100% of FLA)
- Reset Button

Start/Stop:
- Motor start/stop controlled by Start and Stop buttons
- All features of Status Only module

HOA with Start/Stop:
- In 'Hand' mode, motor will start and stop in response to Start/Stop pushbuttons
- In 'Auto' mode, will run in response to remote signal
- All features of Status Only module

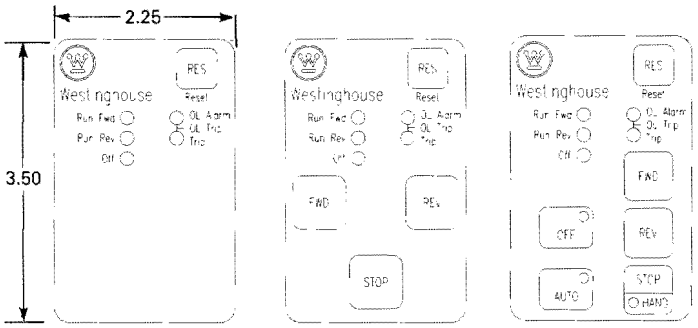
HOA:
- Motor will run in the 'Hand' mode, and not in the 'Off' mode
- In 'Auto' mode the motor will run in response to a remote signal
- All features of Status Only module

Reduced-Voltage Control Modules:
The 4 reduced-voltage pushbutton Advantage Control Modules provide control for reduced-voltage starters using 2-4 starters/contactors. The faceplates are identical to the full-voltage modules, and the pushbuttons all perform the same functions. The module is programmable for the type of reduced-voltage starter which sets the sequence of contactor opening/closing.

ADVANTAGE Control Modules

Accessories and Field Modification Kits, *Continued*

Reversing and 2-Speed ① Pushbutton Modules



Status Only | **Pushbutton Control** | **Fwd-Rev-Off-Auto Control**

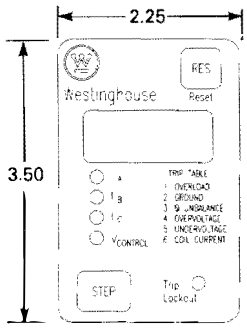
Status Only:
- 5 LED's which indicate that the motor is Off, running Forward (fast), running Reverse (slow), Tripped or in Alarm mode
- Reset button

Forward (Fast)/Reverse (Slow)/Stop:
- Pushbuttons control whether motor is running Forward (fast), running Reverse (slow) or Stopped
- All features of Status Only module

Forward/Reverse/Auto
- In 'Auto' mode, motor is running Forward (fast), running Reverse (slow) or Off in response to a remote signal
- All features of Forward/Reverse/Stop module

① For 2-speed modules, "FWD" replaces "FAST" and "REV" replaces "SLOW".

Metering Module



The Advantage Metering Module monitors status of a motor along with any of the pushbutton modules. It may be plugged into the pushbutton control module, and communicates to the starter through it, or plugged directly into the starter when a pushbutton control module is not used.

The 4-digit display will show the current in the 3 phases, control voltage, or cause of trip. The 'Step' button may be pressed to step through these values, and the 5 LED's will indicate which value is being displayed. It is also equipped with a Reset button and Trip Lockout LED.

Specifications

Operating Temperature ..... 0°C to 70°C (32°F to 158°F)
Storage Temperature ..... −20°C to 70°C (−4°F to 158°F)
Humidity ..... 0 to 95% Noncondensing
Max. length of module from Advantage unit ..... 6 ft.

Catalog Numbers

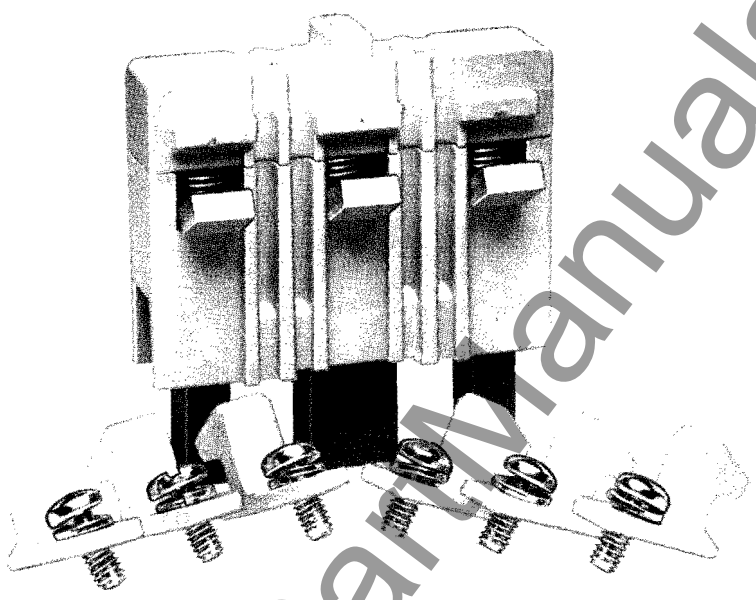
Catalog Number	Description	List Price
WPBFV1	Full-Voltage Status Only w/Reset	$131
WPBFV2	Full-Voltage Start/Stop	185
WPBFV3	Full-Voltage Start/Stop/HOA	227
WPBFV4	Full-Voltage HOA	173
WPBR1	Reversing Status Only w/Reset	185
WPBR2	Reversing Start/Stop	266
WPBR3	Reversing HOA	308
WPB2S1	2-Speed Status Only w/Reset	185
WPB2S2	2-Speed Start/Stop	266
WPB2S3	2-Speed HOA	308
WPBRV1	Reduced Voltage Status Only w/Reset	131
WPBRV2	Reduced Voltage Start/Stop	185
WPBRV3	Reduced Voltage Start/Stop/HOA	227
WPBRV4	Reduced Voltage HOA	173
WMETER	Metering Module	298
WACM6	6 Ft. Cable	21
WACM3	3 Ft. Cable	18
WACM1	1 Ft. Jumper	15

ADVANTAGE Contactors and Starters

Nonreversing and Reversing, NEMA Sizes 1-6
Classes W200, W201, W210, W211, W250, W251

Renewal Parts

Contact Kits

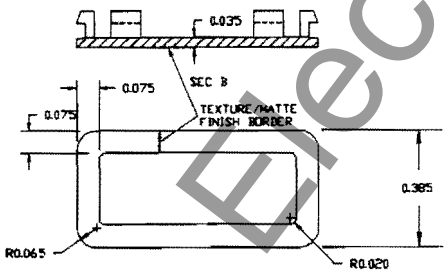


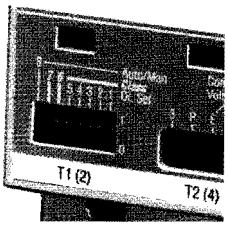
Catalog Numbers

Cat. No.	Description	List Price
WCK13	Replacement Contact Kit Sz. 1, 3 Pole	$ 160
WCK23	Replacement Contact Kit Sz. 2, 3 Pole	200
WCK33	Replacement Contact Kit Sz. 3, 3 Pole	266
WCK43	Replacement Contact Kit Sz. 4, 4 Pole	560
WCK53	Replacement Contact Kit Sz. 5, 3 Pole	1476
WCK63	Replacement Contact Kit Sz. 6, 3 Pole	3372

Discount Symbol C10-R4

OL Selection DIP Switch Window





- Simple snap-in installation allows clear visibility of DIP switches
- Prevents unwanted tampering of DIP switch settings
- Once in must be pried out from rear
- One supplied with each starter

Package of 10

Cat. No.	List Price
WDIPSW10	$19

ADVANTAGE Contactors and Starters

Nonreversing, NEMA Sizes 1-6
Classes W200, W201

Technical Data

Electrical Characteristics, Sizes 1-6

	Size 1	Size 2	Size 3	Size 4	Size 5	Size 6
Maximum Voltage Rating	600 V	600 V	600 V	600 V	600 V	600 V
Ampere Rating (Open)	30 A	50 A	100 A	150 A	300 A	600 A
(Enclosed)	27 A	45 A	90 A	135 A	270 A	540 A
Squirrel Cage Motor Maximum Horsepower At:						
200 V-60 Hz	7½ HP	10 HP	25 HP	40 HP	75 HP	150 HP
230 V-60 Hz	7½ HP	15 HP	30 HP	50 HP	100 HP	200 HP
380 V-50 Hz	10 HP	25 HP	50 HP	75 HP	150 HP	300 HP
460-575 V-60 Hz	10 HP	25 HP	50 HP	100 HP	200 HP	400 HP
Resistive Heating, KW① Three Phase, 3 Pole						
120 V	5 KW	8.5 KW	17 KW	26 KW	52 KW	105 KW
240 V	10 KW	17 KW	34 KW	68 KW	105 KW	210 KW
480 V	20 KW	34 KW	68 KW	105 KW	210 KW	415 KW
600 V	25 KW	43 KW	86 KW	130 KW	260 KW	515 KW
Capacitor Switching KVAR, Three-Phase						
240 V	...	12 KVAR	27 KVAR	40 KVAR	80 KVAR	160 KVAR
480 V	...	25 KVAR	53 KVAR	80 KVAR	160 KVAR	320 KVAR
600 V	...	31 KVAR	67 KVAR	100 KVAR	200 KVAR	400 KVAR
Transformer Switching, KVA② Three-Phase, 3-Pole						
208 V	3.6 KVA	6.3 KVA	12 KVA	20 KVA	41 KVA	81 KVA
240 V	4.3 KVA	7.2 KVA	14 KVA	23 KVA	47 KVA	94 KVA
480 V	8.5 KVA	14 KVA	28 KVA	47 KVA	94 KVA	188 KVA
600 V	11 KVA	18 KVA	35 KVA	59 KVA	117 KVA	234 KVA

① Resistive loads having inrush currents not exceeding 1.5 times continuous rating.
② Transformers having inrush currents not more than 20 times peak of continuous current ratings. For inrush currents greater than 20 times refer to Westinghouse.

380 Volts, 50 Hz Starters – Max. HP Ratings

NEMA Size	1	2	3	4	5	6
Max. HP	10	25	50	75	150	300

Phase Loss and Phase Unbalance Protection

- If the unbalance on any of two phases is greater than 30% of the DIP switch selected trip rating, a phase loss/unbalance trip is declared and a trip occurs. No time delay is required for reset.

Class II Ground-Fault Protection

- Will not nuisance trip on starting
- Selected at 20% of maximum continuous ampere rating

Size	Trip Rating (amps)	Start Delay	Run Delay
1③④	1-270	20 sec	1 sec
1	5-270	20 sec	1 sec
2	10-450	20 sec	1 sec
3	15-900	20 sec	1 sec
4	30-1350	20 sec	1 sec
5	60-2700	20 sec	1 sec
6	120-5400	20 sec	1 sec

③ For Motor FLA current range of 0.47A thru 3.81A with a 1.15 to 1.25 S.F.
④ For Motor HP range of ¼ HP to 2 HP at 460V.

ADVANTAGE Contactors and Starters

Nonreversing, NEMA Sizes 1-6
Classes W200, W201

Technical Data, *Continued*

Operating Coil Characteristics at Rated Coil Volts, Sizes 1-6

The following represent typical production test values and should not be interpreted as a guarantee of actual performance.

	Size 1	Size 2	Size 3	Size 4	Size 5	Size 6
AC Coil						
Burden (Open VA)	250 VA	250 VA	500 VA	500 VA	2600 VA	2600 VA
(Closed VA)	25 VA	25 VA	50 VA	50 VA	50 VA	50 VA
(Closed Watts)	5 W	5 W	10 W	10 W	10 W	10 W
Pick-up Volts①	78 V	78 V	78 V	78 V	78 V	78 V
Drop-out Volts①	60 V	60 V	60 V	60 V	60 V	60 V

Alternating-current operated contactors shall withstand 110 percent of their rated voltage continuously without injury to the operating coils and shall close successfully at 85 percent of their rated voltage.

Mechanical Characteristics, Sizes 1-6

	Size 1	Size 2	Size 3	Size 4	Size 5	Size 6
Dimensions – Inches						
Height	6.50	6.50	8.00	8.00	10.08	10.08
Width	2.50	2.50	3.68	3.68	7.07	7.07
Depth	4.96	4.96	6.54	6.54	7.64	7.64
Panel Area – Square Inches	16.25	16.25	29.44	29.44	71.27	71.27
Weight – Pounds	2.00	2.00	6.00	6.00	30.00	30.00
Maximum Cable Size/Phase Copper (AWG/MCM)	8 AWG	4 AWG	250 MCM	250 MCM	1-500 MCM	2-500 MCM
Auxiliary Electrical Circuits Available	8	8	8	8	8	8
Maximum Wire Size for Aux. Elec. Circuit (AWG)	12	12	12	12	12	12
Maximum Wire Size for Control Circuit (AWG)	2-14	2-14	2-14	2-14	2-14	2-14
Mechanical Interlock Combinations Available	Vert. Horiz.	Vert. Horiz.	Vert. Horiz.	Vert. Horiz.	Vert. Horiz.	Vert. Horiz.

Data From Tables 430 – 147 Through 150 of 1987 N.E.C. Motor Amperes at Full Load②, Three Phase AC

HP	Squirrel Cage AC			
	200 Volts	230 Volts	460 Volts	575 Volts
1/6	.....	.....	.....	.....
1/4	1.1	1	.....	.....
1/3	.....	.....	.....	.....
1/2	2.3	2	1	.8
3/4	3.2	2.8	1.4	1.1
1	4.1	3.6	1.8	1.4
1 1/2	6.0	5.2	2.6	2.1
2	7.8	6.8	3.4	2.7
3	11	9.6	4.8	3.9
5	17.5	15.2	7.6	6.1
7 1/2	25	22	11	9
10	32	28	14	11
15	48	42	21	17
20	62	54	27	22
25	78	68	34	27
30	92	80	40	32
40	120	104	52	41
50	150	130	65	52
60	177	154	77	62
75	221	192	96	77
100	230	248	124	99
125	360	312	156	125
150	414	360	180	144
200	552	480	240	192

① Values may vary based upon Control Power Transformer capacities.
② These current values are for motors running at usual speeds and with normal torque characteristics. Motors for special low speed or high torque may require higher current. In all cases, heaters should be selected on basis of information on motor nameplate or motor card data.

ADVANTAGE Contactors and Starters

Nonreversing, NEMA Sizes 1-6
Classes W200, W201

Technical Data, *Continued*

Size 1 Short-Circuit Withstand Ratings

Short-Circuit Protective Device (SCPD)	Max. Rating SCPD	Circuit Breaker Interrupting Rating	Short-Circuit Withstand Rating		Typical Disconnect Device Cat. No.
			Current	Voltage	
Class H Fuse	60A	—	5,000A	600V	DS161, DS162
Class J Fuse	60A	—	100,000A	600V	DS161, DS162
Class R Fuse	60A	—	100,000A	600V	DS161, DS162
Class T Fuse	60A	—	100,000A	600V	DS161, DS162
Thermal/Mag. Type CB③	50A	14,000A	18,000A	600V	FDB
			22,000A	480V	
		25,000A	30,000A	480V	HFB
Magnetic Only① Type CB②	30A	Marked MCP	5,000A	600V	MCP
			25,000A	480V	
Magnetic Only① Type CB②	30A	Marked HMCP	100,000A	480V	HMCP
			50,000A	600V	
Thermal/Mag. Type CB③	50A	25,000A	25,000A	600V	HFD
		65,000A	65,000A	480V	
		100,000A	100,000A	480V	FDC
		35,000A	50,000A	600V	
Mag. Only Type CB + CL④	30A	MCP or HMCP plus Current Limiter	100,000A	600V	MCP + EL or HMCP + EL
Thermal/Mag. Type CLB⑤	50A	150,000A	100,000A	480V	FCL

Size 2 Short-Circuit Withstand Ratings

Short-Circuit Protective Device (SCPD)	Max. Rating SCPD	Circuit Breaker Interrupting Rating	Short-Circuit Withstand Rating		Typical Disconnect Device Cat. No.
			Current	Voltage	
Class H Fuse	100A	—	5,000A	600V	DS263
Class J Fuse	100A	—	100,000A	600V	DS263
Class R Fuse	100A	—	100,000A	600V	DS263
Class T Fuse	100A	—	100,000A	600V	DS263
Magnetic Only① Type CB②	50A	Marked HMCP	100,000A	480V	HMCP
			50,000A	600V	
Thermal/Mag. Type CB③	150A	14,000A	5,000A	600V	FDB
	90A	65,000A	65,000A	480V	HFD
		25,000A	25,000A	600V	HFD
		100,000A	100,000A	480V	FDC
		35,000A	35,000A	600V	FDC
Mag. Only Type CB + CL④	50A	HMCP + Current Limiter	100,000A	600V	HMCP + EL
Thermal/Mag. Type CLB⑤	90A	150,000A	100,000A	480V	FCL

Size 3 Short-Circuit Withstand Ratings

Short-Circuit Protective Device (SCPD)	Max. Rating SCPD	Circuit Breaker Interrupting Rating	Short-Circuit Withstand Rating		Typical Disconnect Device Cat. No.
			Current	Voltage	
Class H Fuse	400A	—	5,000A	600V	DS364
Class J Fuse	400A	—	100,000A	480V	DS364
			65,000A	600V	
Class R or Class T Fuse	400A	—	100,000A	480V	DS364
			65,000A	600V	
Magnetic Only① Type CB②	100A	Marked HMCP	100,000A	480V	HMCP
			50,000A	600V	
Thermal/Mag.	150A	100,000A	100,000A	480V	FDC
		35,000A	35,000A	600V	
Mag. Only Type CB + CL④	100A	HMCP plus Current Limiter	100,000A	600V	HMCP + CL
Thermal/Mag. Plus CL⑤	150A	150,000A	100,000A	600V	HFD + CL

Size 4 Short-Circuit Withstand Ratings

Short-Circuit Protective Device (SCPD)	Max. Rating SCPD	Circuit Breaker Interrupting Rating	Short-Circuit Rating		Typical Disconnect Device Cat. No.
			Current	Voltage	
Class H Fuse	400A	—	10,000A	600V	DS465
Class J Fuse	400A	—	100,000A	480V	150A FD-K Motor Circuit Sw.
			65,000A	600V	
Class R or Class T Fuse	400A	—	—	—	250A JD-K Motor Circuit Sw
Magnetic Only① Type CB②	150A	Marked HMCP	100,000A	480V	HMCP
			50,000A	600V	
Thermal/Mag. Type CB③	250A	100,000A	100,000A	480V	JDC
		35,000A	50,000A	600V	
		65,000A	65,000A	480V	HJD
		25,000A	25,000A	600V	
Mag. Only Type CB + CL④	150A	HMCP + Current Limiter	100,000A	600V	HMCP + CL

Size 5 Short-Circuit Withstand Ratings

Short-Circuit Protective Device (SCPD)	Max. Rating SCPD	Circuit Breaker Interrupting Rating	Short-Circuit Rating		Typical Disconnect Device Cat. No.
			Current	Voltage	
Class H Fuse	600A	—	10,000A	600V	MCS
Class R, J Fuse	600A	—	100,000A	600V	400A KD-K Molded Case Sw.
Magnetic Only① Type CB②	250A	Marked HMCP	50,000A	600V	HMCP
			100,000A	480V	
	400A		25,000A	600V	
			100,000A	480V	
Thermal/Mag. Type CB③	400A	35,000A	25,000A	600V	HKD
		65,000A	65,000A	480V	
		50,000A	100,000A	600V	KDC

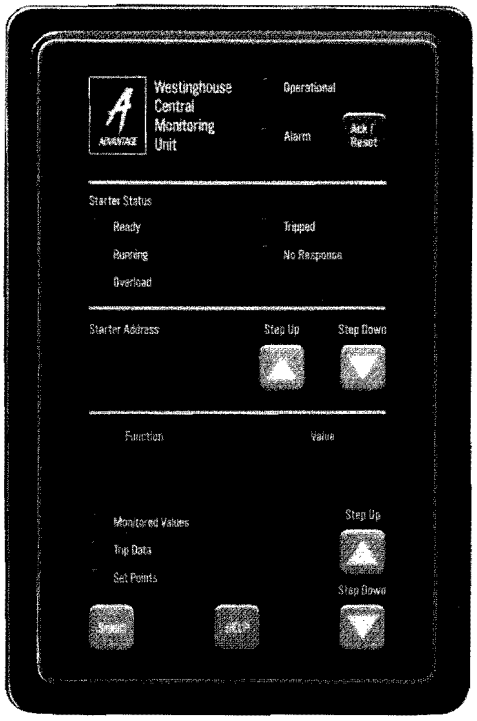
Size 6 Short-Circuit Withstand Ratings

Short-Circuit Protective Device (SCPD)	Max. Rating SCPD	Circuit Breaker Interrupting Rating	Short-Circuit Rating		Typical Disconnect Device Cat. No.
			Current	Voltage	
Class H Fuse	800A	—	18,000A	600V	MCS
Class R or J Fuse	600A	—	65,000A	600V	600A LD-K Molded Case Sw
			100,000A	480V	
Class L Fuse	800A	—	65,000A	600V	600A LD-K Molded Case Sw.
			100,000A	480V	
Magnetic Only① Type CB②	600A	Marked HMCP	25,000A	600V	HMCP
			100,000A	480V	
	800A	Marked HMC	25,000A	600V	HMC M/C
			65,000A	480V	
Thermal/Mag. Type CB③	800A	25,000A	25,000A	600V	HMC T/M
		50,000A	65,000A	480V	
	600A	25,000A	35,000A	600V	HLD
		65,000A	65,000A	480V	
Thermal Mag④ Type CB + CL	800A	200,000A	100,000A	600V	NB + TRI PAC

① Instantaneous Adjustable Trip.
② Circuit Breaker.
③ Inverse Time Circuit Breaker.
④ Instantaneous Adjustable Trip with Current Limiting Attachment.
⑤ Inverse Time with Built-In Current Limiting Attachment.

IMPACC Communication Devices

ADVANTAGE Central Monitoring Unit



Description

The Advantage Central Monitoring Unit is a communications center which transmits to and receives data from up to 99 Advantage starters or contactors or IQ500s equipped with PONI cards. The CMU can be mounted on the door of an MCC or other custom panel using the existing IQ coutout dimensions.

The 8-digit alphanumeric display monitors active data, trip data, or setpoints. The group of data being displayed is indicated by one of three LEDs and is selected by the user.

The 2-digit alphanumeric display indicates the address of the device about which the data is being displayed. This address is also selected by the user.

5 LEDs are provided which indicate the present status of the selected starter. Two additional LEDs are also provided at the top of the panel; one which indicates that the CMU is "operational," and another which indicates "alarm" status. An acknowledge/reset button permits the user to reset the CMU following a device trip.

The CMU can be interfaced into a larger IMPACC network with the addition of an IMPACC PONI Communications Module.

Parameters Displayed

- Monitored values
  1. Device Description
  2. I_A, I_B, I_C Currents
  3. Control Voltage (excluding IQ500)
  4. Present Time, Date
  5. Resettable Operation Count
  6. Run Time, hrs
- Trip Data
  Same as current values with cause of trip
- Setpoints
  1. Device Size
  2. OL Trip Rating Value (FLA Setting)
  3. OL Trip Class
  4. Ground Fault Protection – On/Off
  5. Phase Loss/Unbalance Protection – On/Off
  6. Reset Type – Auto/Manual
  7. Frequency
  8. Ground Fault Trip Level (IQ500 Only)
  9. Ground Fault Trip Delay Time (IQ500 Only)
  10. Phase Unbalance % (IQ500 Only)

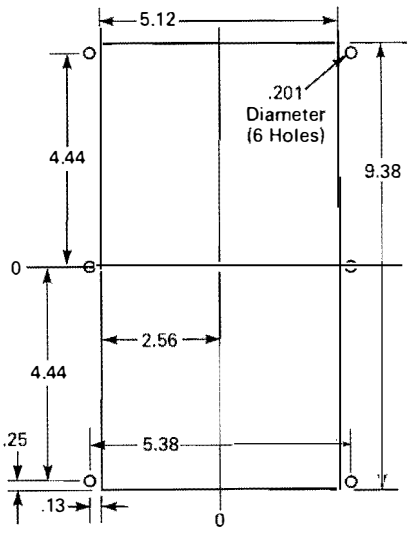
- IQ500M – Special Functions Module Setpoints
  If Load Control Selected:
  1. Load Shed Level
  2. Load Shed Delay Time
  3. Load Resume Level
  4. Load Resume Delay Time
  5. Long Acceleration Time

  If Underload/Jam Selected:
  1. Jam Trip Level
  2. Jam Trip Delay Time
  3. Jam Start Delay Time
  4. Underload Trip Level
  5. Underload Trip Delay Time
  6. Underload Start Delay Time
  7. Long Acceleration Time
  8. Relay Control

IMPACC Communication Devices

ADVANTAGE Central Monitoring Unit

Chassis Cutout Dimensions, Inches

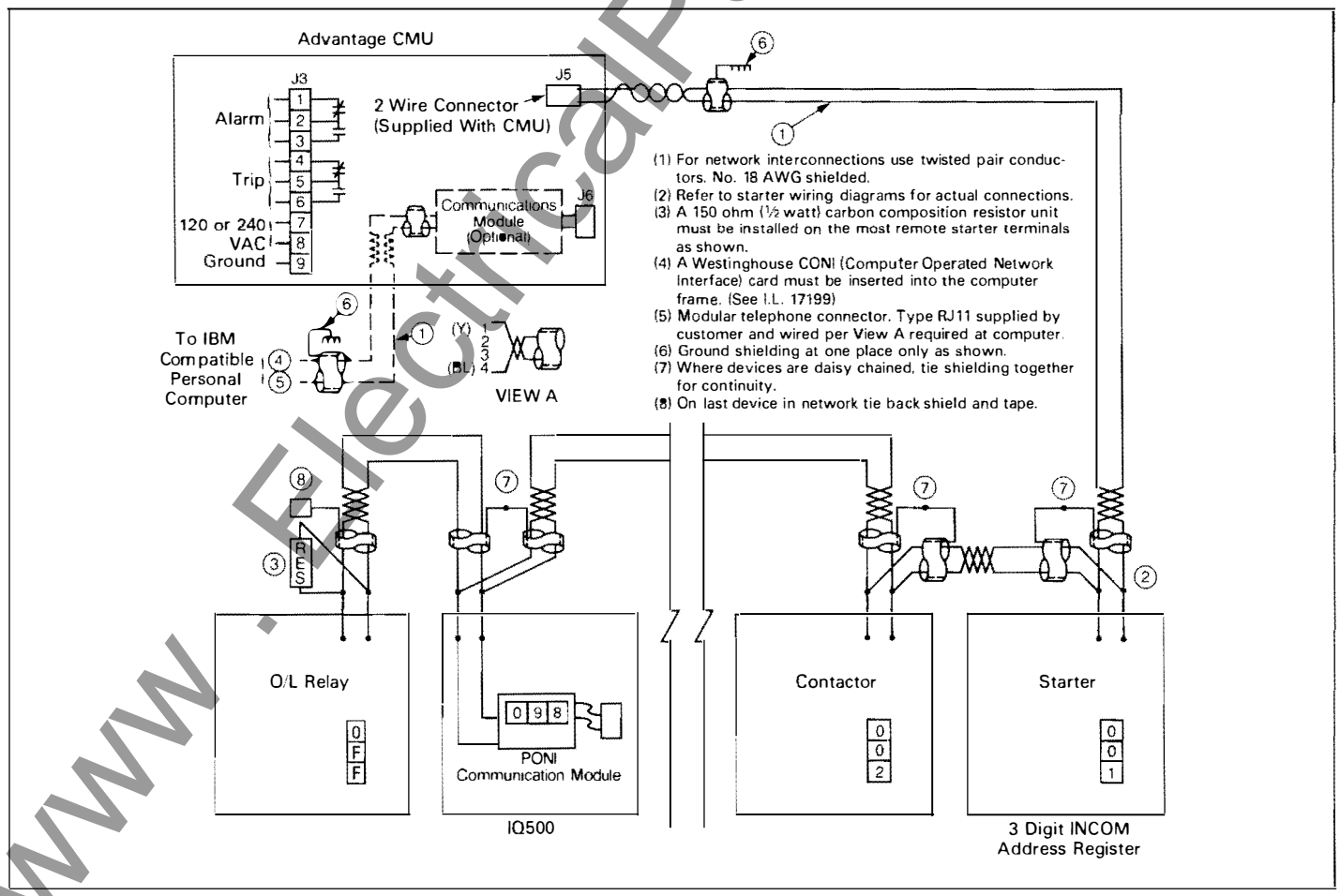


Specifications

Device's Power Requirement	10 VA Maximum
Frequency	50/60 Hz
Line Characteristics	120 or 240 Vac + 20%, −20% (Autoselected)
Operating Temperature	0°C to 70°C (32° to 158°F)
Storage Temperature	−20° to 85°C (−4°F to 185°F)
Humidity	0 to 95% R.H. noncondensing
Alarm Contact Ratings	10 Amperes @ 240 VAC (Resistive) 10 Amperes @ 30 VDC (Resistive)

Catalog Number	Description	List Price
WCMU	ADVANTAGE Central Monitoring Unit	$1275

Typical Wiring Diagram



IMPACC Communication Devices

ADVANTAGE Product Operated Network Interface – PONI

Description

To use the IMPACC network with Advantage Motor Control, a PONI is required for each device. There are two PONI options:

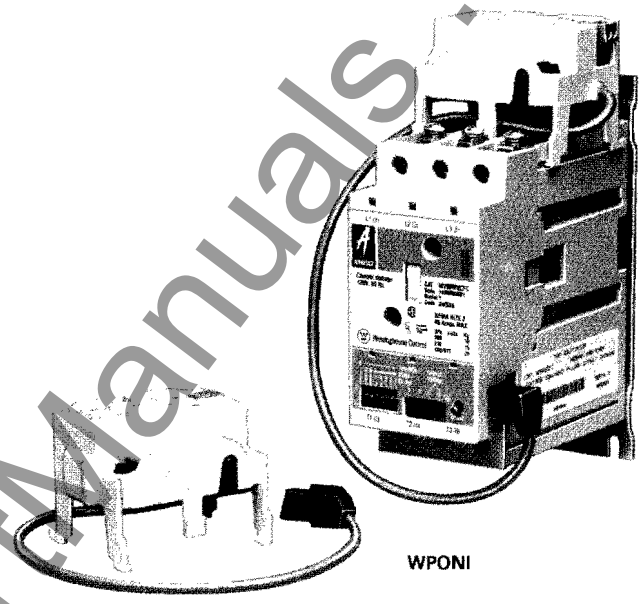
Functions

Advantage PONI
On-Off-Reset
Status (On, Off, Tripped, No Response)
3-Phase Current
% Phase Unbalance
Control Voltage
OL Protection Settings
Cause of Trip
Trip Data

Control-Only PONI
On-Off-Reset
Status (On, Off, Tripped, No Response)

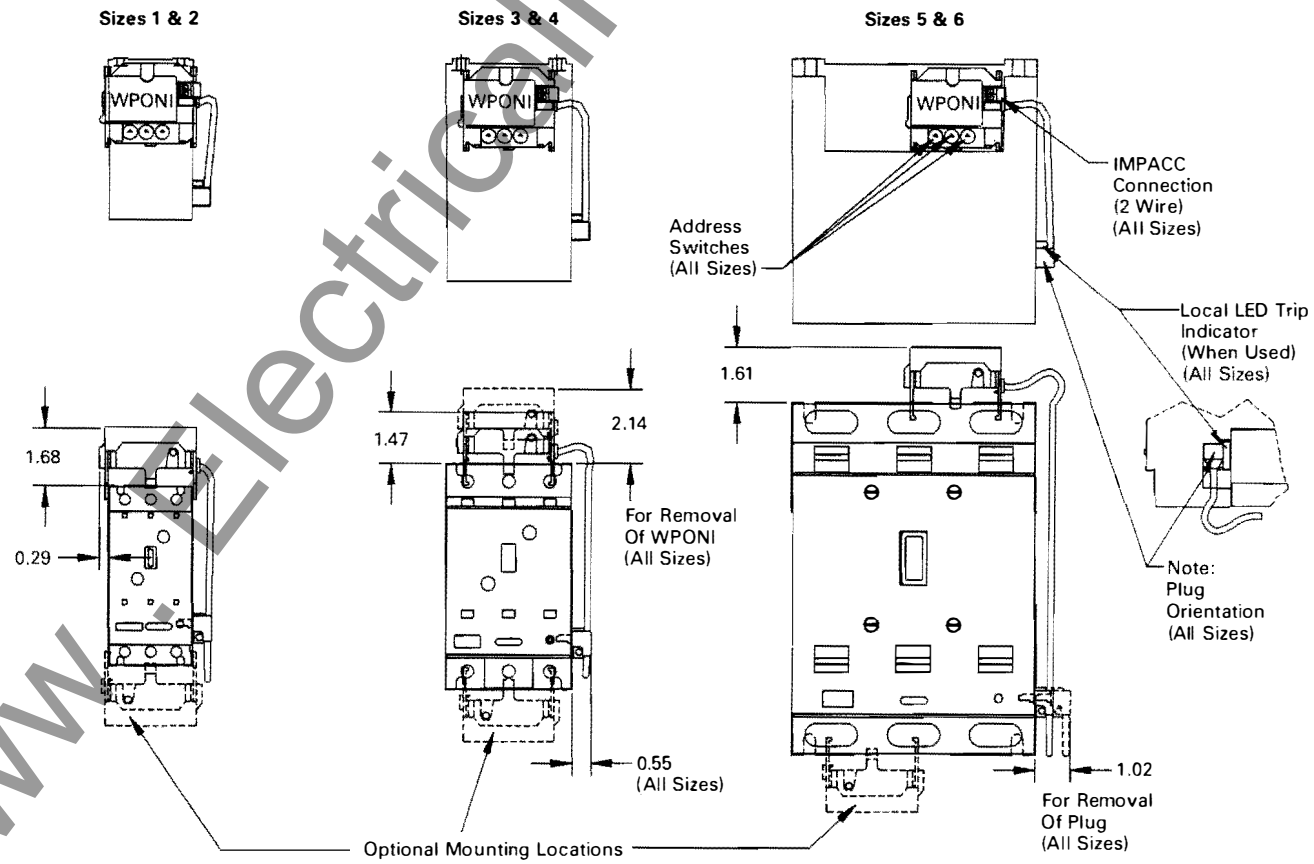
Catalog and Style Number and List Price

Cat. No.	Description	List Price
WPONI	Advantage PONI	$298
WCTL PONI	Advantage Control – Only PONI	54



WPONI

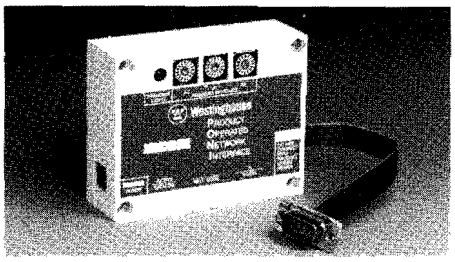
Mounting Procedures – WPONI and WCTLPONI



IMPACC Communication Devices

Description

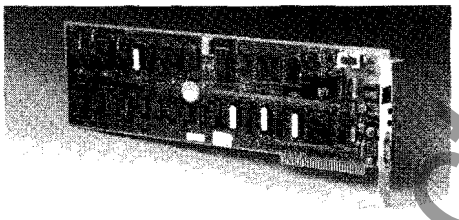
Product Operated Network Interface Card for IQ-1000, IQ Data, IQ Data Plus II, AEM, ADVANTAGE CMU



The Product Operated Network Interface (PONI) Card is a housing for the INCOM chip and is necessary for communication between the master control and these system devices: IQ Data Plus™, IQ-1000™, and the Assemblies Electronic Monitor. (The INCOM chip is an integral part of the other system devices.) The PONI Card is easily mounted on the back of these devices and requires no external power for operation.

- Temperature range from 0° to 70°C.
- 3 hexadecimal wheels provide the ability to give each product a unique address.
- LED indicates transmission.
- Connected daisy-chain style using twisted pair.

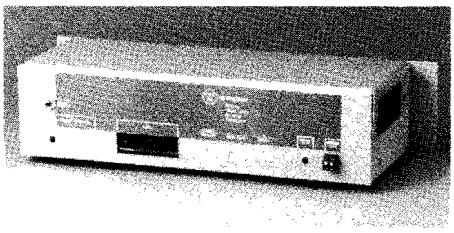
Computer Operated Network Interface Card



The Computer Operated Network Interface (CONI) Card communicates information from a computer control station to an IMPACC network device.

- Ease of installation into expansion slot of IBM (or approved clone) PC.
- 2 LED's are illuminated when data is transmitted and received.
- A 6 pin modular telephone jack connects the CONI to the IMPACC network.
- Component software is included. This is an open program written in compiled basic that the customer may enhance to fill specific needs.

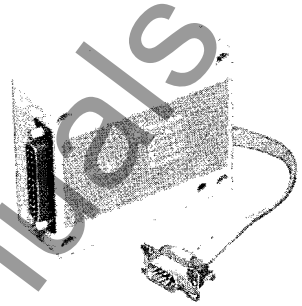
Master INCOM Network Translator (IMPACC)



The Master INCOM Network Translator (MINT) translates the 33 bit binary message used on the Westinghouse IMPACC local area network to and from a 10 byte ASCII encoded hexadecimal RS232C message. The MINT enables any device with an RS232C port to function as an IMPACC network master.

- Rubber feet for bench or table mounting.
- Brackets for panel mounting.
- Communication Protocol – Communicate using the 10 byte protocol described in the RS232C/INCOM network protocol manual. Buffering-protocols have different information density and different baud rates. Handshaking Lines – To help control data flow.
- RS232C system grounding.
- Adjustable baud rates.

RS232 PONI Module for IQ1000, IQ Data, IQ Data Plus II, AEM, ADVANTAGE CMU



The RS232 Product Operated Network Interface (PONI) module is designed to communicate information from a solid-state control device through a single non-network (non-shared) RS232 communication channel to a computer control station.

The RS232 PONI module is powered by the product it is attached to and needs no other source of power.

The RS232 PONI module can operate with surrounding air at a temperature in the range of 0° to 70°C.

As the RS232 PONI module operates over a single point-to-point communication channel, it needs no address switches. A Light Emitting Diode (LED) is provided to indicate when communication is occurring.

- LED indicates transmission.
- INCOM/RS232 protocol manual included.

List Prices
For list prices and ordering information see IMPACC and IQ Family Price List 8174.

IMPACC Systems

IMPACC Systems
Integrated Monitoring Protection and Control Communications System

Description

Westinghouse IMPACC is the unique new system that ties together, for the first time, multiple monitoring, protection, and control devices in a building's electrical distribution system.

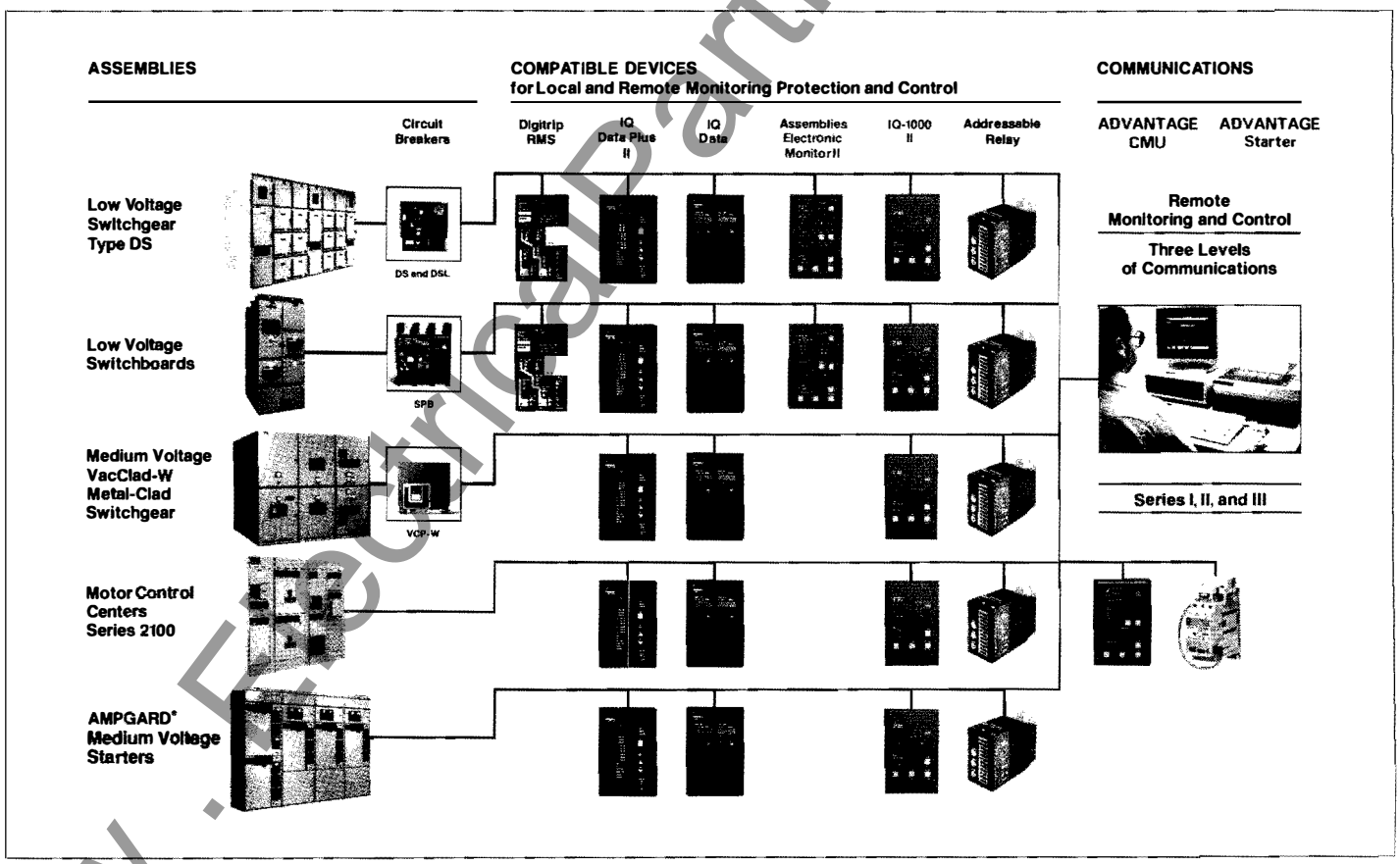
An IMPACC System will:

- Enhance building management.
- Improve industrial building operations and management.
- Minimize excessive downtime.
- Provide troubleshooting capabilities.

From a central location, an operator uses a master control unit to monitor, control, and communicate with all devices on the distribution system. This includes: monitoring and control of gear such as switchgears, motor control centers, and medium-voltage starters; obtaining information, via digital metering, from circuit breakers, and motor protection and metering devices; and total lighting control.

As many as 1,000 devices can easily be on the IMPACC System and communications lines can be extended up to 7,500 feet from the master control unit without repeaters. Installation is uncomplicated and devices are connected, daisy-chain style, via a twisted pair wire.

IMPACC can be installed in the distribution system of a completely new facility, an existing Westinghouse system, or another manufacturer's system retrofitted with Westinghouse devices. IMPACC can be easily expanded to accommodate requirements of a growing distribution system.



IMPACC Systems
Communication Levels

Description, *Continued*

The IMPACC system utilizes three basic communication system choices. From these three options, the groundwork is laid to build an IMPACC System for any application.

IMPACC Series I

Computer Operated Network Interface with Component Software
Series I includes a manual and a software program that is furnished to the customer on a floppy diskette. This program is flexible because customers can write additional software to accommodate specific requirements. (Simulated programs for devices not on the distribution system are included.) Additionally, Series I software can expand with the distribution system and is recommended for customers who may not require all capabilities available with the Series III program.

Also included is a Computer Operated Network Interface (CONI) Expansion Card that includes an INCOM chip and is necessary for communications with compatible devices on the IMPACC System. The CONI Expansion Card is inserted into the expansion slot of the master control computer and interrogates each compatible device (via a unique address) and collects information from them. (Refer to I.L. 17199.)

Series I provides the capability for on-site remote communications with the IMPACC System master control unit, or this master control unit may be located remotely off-site and connected to the electrical distribution system via a telephone modem and Master INCOM Network Translator (MINT) unit. (Refer to I.L. 17200.) This allows for the capability of tying together multiple buildings and remotely monitoring the electrical distribution systems of each building in a central location.

Other Series I features include:
- Time/event data logging
  The time and causes of *certain* device events are logged directly on the master control unit screen or printer.
- Device alarm/trip status logging
  Status changes in any device, or the system itself, are identified and an alarm is signaled at the master control unit.
- Information storage and retrieval by device events
  This provides basic data that can be used in providing a general overview of system alarms, device events, and report generation.
- Hardware diagnostics
  This provides information on *certain* device or system malfunctions such as missing devices.

IMPACC Series II

Master INCOM Network Translator
Series II provides customers with the opportunity to custom tailor their own IMPACC System software program.

This is possible because Series II utilizes a Master INCOM Network Translator (MINT) unit to translate communications used in an IMPACC System to and from an RS232 message (translates the 33 bit binary INCOM messages to and from a 10 byte ASCII encoded hexidecimal RS232 message).

The MINT (refer to I.L. 17200) enables any PC or programmable logic controller with an RS232 port to function as the IMPACC system master control unit. It can issue commands to, and request data from, compatible devices along the IMPACC System. It has the flexibility to run with existing RS232 systems.

Along with the MINT, customers receive a Westinghouse INCOM Product RS232 Interface Protocol Manual that describes the structure of RS232 messages, how to issue commands, and how to receive data. This enables customers to write the software to interface the MINT and compatible devices on the IMPACC System. Additionally, it has the flexibility to run with existing RS232 systems.

With the MINT unit, communications can be from a remote location on-site; or the MINT can be on-site and the IMPACC System master control unit can be located off-site and connected to the electrical distribution system via a telephone modem.

IMPACC Series III
Series III is the complete software program with user friendly, menu-driven screens that permit easy set-up and operation. An IBM personal computer is also included as the IMPACC System master control unit.

The program is flexible because only that software necessary for devices on a specific distribution system is provided; but simulated programs for devices not on the system are always included. When the system does expand, Series III software can expand with the system.

Additionally, Series III provides the capability for on-site remote communications with the IMPACC System master control unit; or control can be off-site. This is accomplished by communicating, via a telephone modem, between an off-site computer and the on-site master control unit. A separate software program is available for off-site remote communications.

Series III can also provide monitoring and recording of vital system data as it is occurring. This data can be collected and displayed at the IMPACC System master control unit; or it can be stored in data base format for custom report generation.

Series III features can include:
- System/device alarm logging and reporting
  Any changes in any device, or the system itself, are identified and can be alarmed.
- Time/event data logging
  The time and causes of each event are logged directly on the master control unit screen or a printer.
- Information storage and retrieval by device event
  This provides data that can be used in developing reports that analyze patterns of device and system alarms, peak demand and kWH usage, and overall IMPACC System usage. Reports can be generated from standard formats or customized by the customer. Color diagrams and charts facilitate interpretation of historical trend data.
- Hardware diagnostics
  This provides information on device or system malfunction such as missing devices, printer failures, etc.
- Dedicated computer not required①
  Word processing or other programs can be run while Series III continues to monitor and log events through the use of Microsoft Windows™. An alarm is shown graphically on the screen and an optional audible alarm is available for signaling problems while using the computer for other programs.
- Security①
  Discrete access codes can be assigned to personnel to provide several levels of system security.
- Color graphics
  This provides the capability to create one-line diagrams of facility layouts, substation configurations, and key assemblies.
- Gateway interface①
  This provides for communication of information to other computer systems on an as requested basis.

① Exclusive Series III features.
Microsoft Windows is a trademark of Microsoft Corporation.