Instructions for Class W200, W201, Sizes 3 and 4, Three Phase Non-Reversing Magnetic Motor Starters and Contactors

Fig. 1 Class W200 Size 4 Starter

ADVANTAGE MOTOR CONTROL

Advantage NEMA Size 3 and 4 electrically-operated starters and contactors (motor controllers) have the same physical size, but differ with respect to mechanical parts and settings available.

The motor starters (Class W200) include a solid state current-sensing unit that provides overload protection, phase loss protection, phase imbalance protection, and ground current-sensing protection.

The motor rated contactors (Class W201) do not include overload, phase loss, phase imbalance, or ground current-sensing protection, but they do have the same coil controller that prevents a “contact kiss” position on pickup and dropout when the coil voltage supply drops drastically. Both starters and contactors have this low voltage release. Both require a separate source of control power, preferably taken from the motor supply circuit via a control power transformer.

RATINGS

The maximum horsepower ratings of these motor controllers are shown in Table I.

Kilowatt ratings equivalent to the horsepower ratings shown in Table I are shown in Table II.

TABLE I - MAXIMUM HORSEPOWER RATINGS (60HZ)

Controller Size	Three Phase Horsepower At			
	200V	230V	460V	575V
3	25	30	50	50
4	40	50	100	100

TABLE II - MAXIMUM KILOWATT RATINGS (50HZ)

Controller Size	Three Phase Kilowatts At				
	220V	380V	415V	500V	660V
3	20	37	37	37	37
4	33	55	63	75	75

PROGRAMMED FEATURES

Advantage NEMA Size 3 starters and contactors are assembled with identical parts except for the circuit board to which the control wires are attached. These circuit boards differ with respect to components and the software program they contain.

NEMA Size 4 starters and contactors are likewise similar. They differ from Size 3 devices by virtue of larger contacts, higher ratings and different programs.

Phase Loss Protection - Advantage starters with this option automatically open (trip) within 2 seconds after they sense a current less than 7 amperes through any phase after power is applied to the motor. This protection prevents damage when a lead in a motor branch circuit has been lost.

Phase Imbalance Protection - Advantage starters with this option automatically open (trip) within 9 seconds after they sense an imbalance between two phase currents that is greater than 30% of the Trip Rating shown in Tables IV and V. This protection prevents motor damage when a lead in a distribution system has been lost.

Ground Current-Sensing Protection - Advantage starters with this option automatically open (trip) in 0.4 seconds after sensing ground current greater than 40 amps for a Size 3 or 60 amperes for a Size 4 during motor running. There is a 17-second delay that prevents ground protection from opening (tripping) during starting. If the total current in any phase is greater than 171 amperes for a Size 3 or greater than 256 amperes for a Size 4, ground current-sensing protection will be locked out to allow ground protection to be provided by other protective devices.

INSTALLATION

This industrial type control is designed to be installed, operated, and maintained by adequately trained workmen. These instructions do not cover all details, variations, or combinations of the equipment, its storage, delivery, installation, checkout, safe operation, or maintenance. Care must be exercised to comply with local, state, and national regulations, as well as safety practices for this class of equipment.

These devices are full voltage motor starters (controllers) capable of starting, stopping, and interrupting the locked rotor current of motors within their ratings. They must be protected against short circuits by providing motor branch circuit protection in accordance with the National Electrical Code (NEC) or other applicable electrical code.

In an enclosure with a volume of not less than 1559 cubic inches, mount the motor controller on a vertical plane with its long axis either horizontal or vertical. The preferred orientation is with the line terminals above the load terminals. The contactor control circuit terminals, marked **3-P-E-C** on the nameplate, are accessible for maintenance without removing the arc box cover via the shelf directly above the load terminals. They are suitable for one or two conductors per terminals in any combination of sizes. Keep strip length of these conductors to between 3/16 and 1/4 inch. It may be more convenient to remove the arc box cover. See Figure 2 for outline and mounting dimensions and Table III for wiring data.

TABLE III - WIRING DATA

Controller Size	Circuit Conductor	Wire Range (AWG)	Tightening Torque (lb-in)
3 & 4	Power	14 - 250kcmil	90 - 100
3 & 4	Auxiliary Contact	18 -12	7
3 & 4	Control	18 - 14*	6

Wire with copper conductors only. Use wire rated 75°C or higher based on the ampacity of 75°C wire

*Strip control wires for terminals 3-P-E-C and 96-95-98-E-C not more than 1/4 inch

THE COIL AND COIL CONTROLLER

The contactor portion of these motor controllers is a conventional design except for the circuit board and coil controller. The coil controller prevents the contacts from touching without spring pressure (”contact kiss” position) when the control voltage is low or dips. It prevents coil energization when the control voltage is too low for proper pickup, and yet maintains the armature sealed to the magnet with reduced current when adequate control voltage is present. Maximum benefit of this low voltage response feature is obtained where the control voltage (110VAC, 50HZ, or 120VAC, 60HZ) is supplied by a control power transformer with its primary fed by the motor circuit.

TRIPPED CONDITIONS

Phase loss, phase imbalance, and ground current-sensing protection are provided in a Class W200 motor starter unless the catalog number includes “Y4” (phase loss and phase imbalance protection omitted), “Y7” (ground current-sensing protection omitted), “Y10” (phase loss protection omitted), and/or “Y11” (phase imbalance protection omitted). Check the Test Verification label on the side of the motor controller to determine which features are included.

An Advantage starter trips (turns itself OFF) when it recognizes that phase loss, phase imbalance, ground current, or significant overload conditions exist. The starter must be RESET after tripping before it can be turned on again. These protection functions can be nullified by a DIP switch setting. See **OVERLOAD SETTINGS**. The phase and ground functions can be added or deleted from the starter with the use of the optional Advantage Programming Module (WAPM).

A “trip” condition is shown by the lighting of the light emitting diode (LED) at the side of the starter where this accessory (Catalog No. WLED) has been added. This LED can be replaced by a remote reset and trip indicator (Catalog No. WRSTKL). Both trip indicators require that control power be supplied to the starter to light. Reset any trip by manual means with the power ON. “Manual” resetting consists of completing an electrical circuit between internal terminals with either the reset button provided on the starter or a remote reset kit.

OVERLOAD PROTECTION

A Class W200 motor starter offers overload protection as a Class 10, Class 20, or Class 30 overload relay without the need for heater elements and the resulting heat losses of a thermal overload relay.

ACCESSORIES	
Description	**Catalog Number**
Internal Trip Indicator	WLED
External (remote) Reset for W200, 24 inch Leads*	WRST24
External (remote) Reset for W200, 72 inch Leads*	WRST72
External (remote) Reset/Trip Indicator for W200, 24 inch Leads*	WRSTL24
External (remote) Reset/Trip Indicator for W200, 72 inch Leads*	WRSTL72
Control Circuit Terminal Block with 2.0A fuse and 2 tie points to accept solid, stranded, or lugged conductors for W200 and W201	WTBF16
Communications Module - Data, Status, and Control	WPONI
Communications Module - DeviceNet	WPONIDNA
Central Monitoring Unit to receive WPONI output	WCMU
Alarm Module with one NO Contact	WBELL
Terminal Lug Kit - Size 3 and 4 (one lug per kit)	WTX34
Advantage Metering Module	WMETER
Advantage Programming Module	WAPM
* There is no trip indication available when this accessory is used other than via a communications network.	

TABLE IX - AUXILIARY CONTACT RATINGS		
Voltage	**Make**	**Break**
NEMA A600		
120-600VAC	7200VA	720VA
28 - 120VAC	60A	6A
NEMA Q300		
28-300VDC	69VA	69VA

CONTROL POWER AND TERMINALS, Cont'd

Control power terminals for the motor controller are shown in Figure 3. All the terminals must be supplied by the same phase. The preferred source is a control power transformer whose primary windings are connected across phase L1-L2, although phases L2-L3, phase L3-L1, or phases A, B, and C will provide satisfactory performance. See Figure 13. In any case, the power supplied to terminals 3 and P must be from the same phase as the power to terminals E and C, except that a DC signal in the range of 5 to 125 volts (24 to 96 volts for Model E or later) may be supplied to terminals 3 and P for remote control, provided one side of the DC voltage source is grounded to the same reference point as terminal C.

CONTROL CIRCUIT CHECK

Since an Advantage motor controller can be controlled with an AC signal of 24 to 120 volts at terminals 3 and P, a high impedance fault in the control circuit that bypasses the STOP or START pushbuttons so as to supply voltage in this range can cause controller malfunction, i.e., the fault causes the controller to turn on or the fault nullifies the STOP button. Check pushbutton stations for liquid buildup and the leads to 3 and P for voltage when none should be present.

TABLE X - RENEWAL PARTS	
Description	**Order**
Replacement Contacts, Size 3*	WCK33
Replacement Contacts, Size 4*	WCK43
Replacement Coil, 110-120V	1A48101G01
Replacement Circuit Board, Size 3 W201, 60HZ	WCBC3F
Replacement Circuit Board, Size 3 W201, 50HZ	WCBC3N
Replacement Circuit Board, Size 3, W200, 60HZ	WCBS3F
Replacement Circuit Board, Size 3, W200, 50HZ	WCBS3N
Replacement Circuit Board, Size 4, W201, 60HZ	WCBC4F
Replacement Circuit Board, Size 4, W201, 50HZ	WCBC4N
Replacement Circuit Board, Size 4, W200, 60HZ	WCBS4F
Replacement Circuit Board, Size 4, W200, 50HZ	WCBS4N
Model E Replacement Circuit Board, Size 3 W201, 60HZ	WCBC3EF
Model E Replacement Circuit Board, Size 3 W201, 50HZ	WCBC3EN
Model E Replacement Circuit Board, Size 3, W200, 60HZ	WCBS3EF
Model E Replacement Circuit Board, Size 3, W200, 50HZ	WCBS3EN
Model E Replacement Circuit Board, Size 4, W201, 60HZ	WCBC4EF
Model E Replacement Circuit Board, Size 4, W201, 50HZ	WCBC4EN
Model E Replacement Circuit Board, Size 4, W200, 60HZ	WCBS4EF
Model E Replacement Circuit Board, Size 4, W200, 50HZ	WCBS4EN
DIP Switch Windows (10/pkg)	WDIPSW10
* These kits include contacts, screws, and crossbar assembly with armature attached	