



# WEG CFW100 AC DRIVES SERIAL COMMUNICATIONS QUICK-START GUIDE

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*NOTE: This Quick-Start guide is intended for the sole purpose of establishing communications connections between WEG CFW100 AC Drives and AutomationDirect programmable controllers, or between the CFW100 and the USB port of a personal computer. Please refer to WEG CFW100 documents for specifications and instructions for using the WEG CFW100 AC Drives.*

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## COMMUNICATIONS PARAMETERS SUMMARY

A summary of the WEG CFW100 AC drives Communications Parameters is listed below.

*NOTE:* Refer to the WEG CFW100 Frequency Inverter Micro Mini Drives Programming Manual and the Modbus RTU User’s Manual for a complete listing of all CFW100 AC drives parameters, including details and Modbus addresses.

### SUMMARY – SERIAL COMMUNICATION PARAMETERS

WEG CFW100 Serial Communication Parameters Summary <sup>1</sup>						
Parameter <sup>2</sup>	Range	Setting		Modbus Address		
		Comm	Default <sup>3</sup>	Hex	Modicon <sup>4</sup>	
1) To read parameters, use Function Code 3; To write parameters, use Function Code 6 or 16 2) ♦ indicates a parameter that can be changed only with a stopped motor 3) RO = Read Only 4) Modicon Modbus addressing for the CFW100 is 40000 + the Parameter Address; <i>Example:</i> P222 Modicon Modbus address would be 40000 + 222 = 40222 5) Speed references and commands via Modbus RTU will always be Remote references; not Local 6) Baud rate in the PLC must match the baud rate in the AC drive (19200 bits/s)						
<b>General Parameters</b>						
<b>P000</b>	Access to Parameters	0 to 9999		1	0	40000
<b>P001</b>	Speed Reference	0 to 9999	RO	RO	1	40001
<b>P002</b>	Output Speed (Motor)	0 to 9999	RO	RO	2	40002
<b>P003</b>	Motor Current	0.0 to 40.0 A	RO	RO	3	40003
<b>P004</b>	DC Link Voltage (Ud)	0 to 524 V	RO	RO	4	40004
<b>P005</b>	Output Frequency (Motor)	0.0 to 400.0 Hz	RO	RO	5	40005
♦ <b>P200</b>	Password	0 = Inactive 1 = Active 2 to 9999 = New Password		0	C8	40200
<b>Parameters necessary to communicate with the drive using module CFW-485</b>						
♦ <b>P220</b>	LOC/REM Selection Source <sup>5)</sup>	0 = Always Local 1 = Always Remote 2, 3 = not used 4 = DIx 5 = Serial/USB (LOC) 6 = Serial/USB (REM) 7, 8 = not used 9 = CO/DN/DP (LOC) 10 = CO/DN/DP (REM) 11 = SoftPLC	1	0	DC	40220
♦ <b>P222</b>	REM Reference Selection	0 = HMI Keys 1 = AI1 2 = AI2 3 = not used 4 = FI 5 = AI1 + AI2 > 0 6 = AI1 + AI2 7 = E.P. 8 = Multispeed 9 = Serial/USB 10 = not used 11 = CO/DN/DP 12 = SoftPLC 13 = not used 14 = AI1 > 0 15 = AI2 > 0 16 = not used 17 = FI > 0	9	1	DE	40222
(table continued next page)						

<b>WEG CFW100 Serial Communication Parameters Summary<sup>1</sup> – (continued)</b>						
<b>Parameter<sup>2</sup></b>	<b>Range</b>	<b>Setting</b>		<b>Modbus Address</b>		
		<b>Comm</b>	<b>Default<sup>3</sup></b>	<b>Hex</b>	<b>Modicon<sup>4</sup></b>	
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♦P226	REM FWD/REV Selection	0 = Forward 1 = Reverse 2, 3 = not used 4 = DIx 5 = Serial/USB (FWD) 6 = Serial/USB (REV) 7, 8 = not used 9 = CO/DN/DP (FWD) 10 = CO/DN/DP (REV) 11 = not used 12 = SoftPLC		4	E2	40226
♦P227	REM Run/Stop Selection	0 = HMI Keys 1 = DIx 2 = Serial/USB 3 = not used 4 = CO/DN/DP 5 = SoftPLC	2	1	E3	40227
♦P308	Serial Address	1 to 247	1	1	134	40308
♦P310	Serial Baud Rate <sup>6)</sup>	0 = 9600 bits/s 1 = 19200 bits/s 2 = 38400 bits/s	1	1	136	40310
♦P311	Serial Interface Byte Configuration	0 = 8 bits, np, 1 stop bit 1 = 8 bits, even, 1 stop bit 2 = 8 bits, odd, 1 stop bit 3 = 8 bits, np, 2 stop bits 4 = 8 bits, even, 2 stop bits 5 = 8 bits, odd, 2 stop bits	1	1	137	40311
♦P312	Serial Protocol	0, 1 = reserved 2 = Slave Modbus RTU 3, 4 = reserved 5 = Master Modbus RTU	2	2	138	40312
P313	Action for Comm Error	0 = Inactive 1 = Ramp Stop 2 = General Disable 3 = Go to LOC 4 = LOC Keep Enable 5 = Cause Fault	1	1	139	40313
♦P314	Serial Watchdog	0.0 to 999.0	0.0	0.0	13A	40314
P316	Serial Interface Status	0 = Inactive 1 = Active 2 = Watchdog Error	RO	RO	13C	40316

(table continued next page)

**WEG CFW100 Serial Communication Parameters Summary<sup>1</sup> – (continued)**

Parameter <sup>2</sup>	Range	Setting		Modbus Address		
		Comm	Default <sup>3</sup>	Hex	Modicon <sup>4</sup>	
1) To read parameters, use Function Code 3; To write parameters, use Function Code 6 or 16 2) ♦ indicates a parameter that can be changed only with a stopped motor 3) RO = Read Only 4) Modicon Modbus addressing for the CFW100 is 40000 + the Parameter Address; <i>Example: P222 Modicon Modbus address would be 40000 + 222 = 40222</i> 5) Speed references and commands via Modbus RTU will always be Remote references; not Local 6) Baud rate in the PLC must match the baud rate in the AC drive (19200 bits/s)						
<b>P680</b>	Logical Status	0 to FFFF (hex) Bit 0 = reserved Bit 1 = Run Command Bit 2 = Fire Mode Bits 3 and 4 = reserved Bit 5 = 2nd Ramp Bit 6 = Config. Status Bit 7 = Alarm Bit 8 = Running Bit 9 = Enabled Bit 10 = Forward Bit 11 = JOG Bit 12 = Remote Bit 13 = Undervoltage Bit 14 = reserved Bit 15 = Fault	RO	RO	2A8	40680
<b>P681</b>	Motor Speed in 13 bits	0 to FFFF (hex)	RO	RO	2A9	40681
<b>P682</b>	Serial//USB Control	0 to FFFF (hex) Bit 0 = Ramp Enable Bit 1 = General Enable Bit 2 = Run Forward Bit 3 = JOG Enable Bit 4 = Remote Bit 5 = 2nd Ramp Bit 6 = reserved Bit 7 = Fault Reset Bit 8 to 15 = reserved	RO	RO	2AA	40682
<b>P683</b>	Serial/USB Speed Reference	0 to FFFF (hex)	RO	RO	2AB	40683

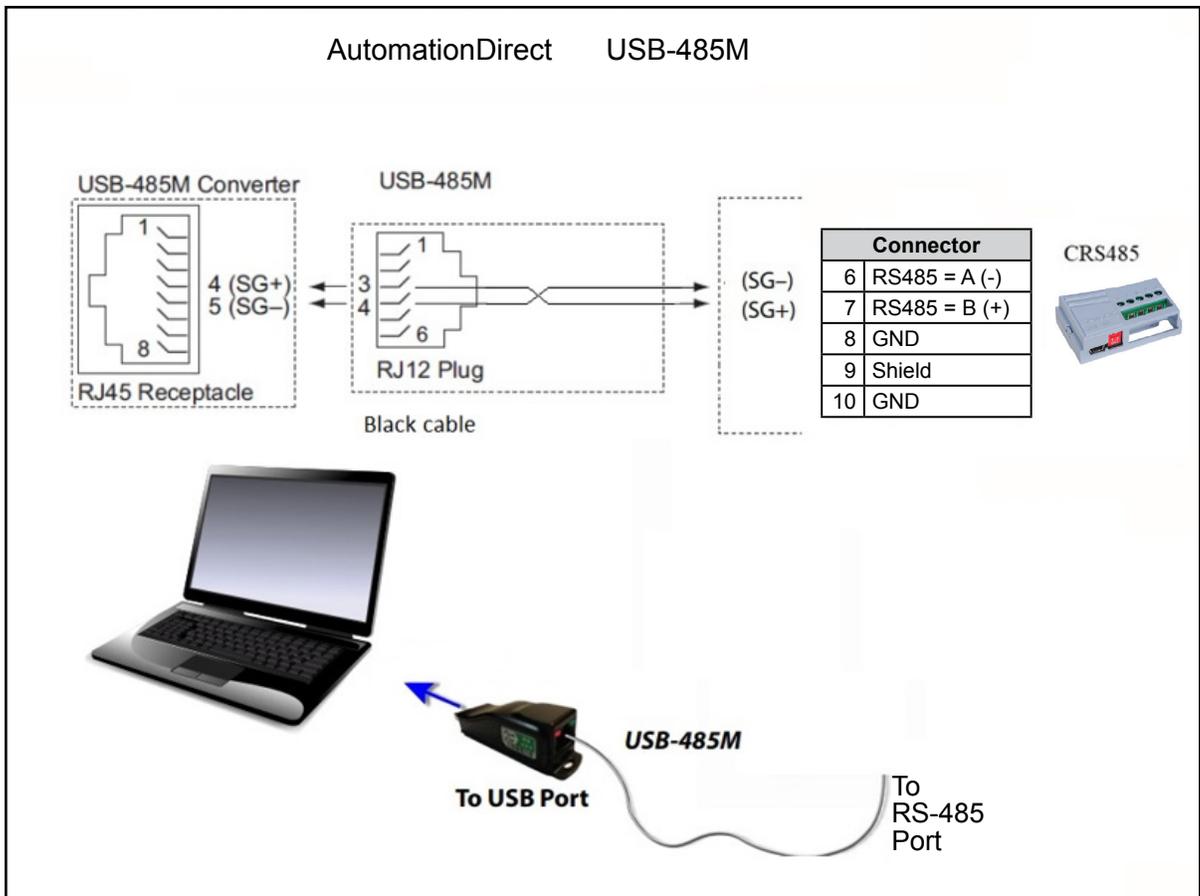
### EXPLANATION OF SCALING/COUNT FREQUENCY COMMAND/FEEDBACK

- When using WEG CFW100 drives, speed/frequency is shown in counts. In order to convert to Hz/ rpm, it is needed to know that the Base Frequency (P403) is equivalent to 8192 (2<sup>13</sup>). Also, the Motor Rated speed (P402) can be scaled using the same method.
- Actual Frequency (P681) and Command Frequency (P683) can be calculated using that ratio.
- For instance: P681 = 2048(dec).
- Freq = 2048\*60.00/8192 = 15.00 Hz
- RPM = 2048\*1740/8192 = 435.00 rpm

### CONNECTING PC TO CFW100 USING AUTOMATIONDIRECT CABLE USB-485M

An AutomationDirect cable, part number USB-485M, provides a quick and easy method of communicating to a WEG CFW100 AC Drive from a PC which has WEG CFW-WPS software installed.

*NOTE: Refer to the WEG WPS Software User Manual for information and instructions regarding using the WPS software to configure CFW100 AC Drives.*



## CONNECTING COMMUNICATION CABLES TO CFW100 AC DRIVES

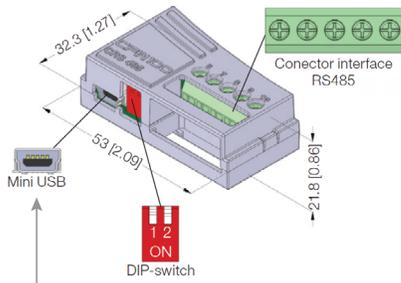


The CFW100-CRS485 drive communication module includes a DIP switch that will switch in a 120Ω terminating resistor for the RS-485 network.

The CFW100 serial communication port is an RS-485 input. Please note that terminals A(-) and B(+) are shared with the USB connector. CFW100 to CFW100 serial connections can be accomplished with standard RS-485 cable (L19827-1 or similar). RS-232 signals can be converted to RS-485 by using a separate converter (see the FA-ISOCAN drawings on [page 5-8](#)).

### CFW100-CRS485 SERIAL COMMUNICATIONS MODULE

CFW100-CRS485



Please read "IMPORTANT NOTE"!

Figure A2: CFW100-CRS485 dimensions in mm [in] and connectors location

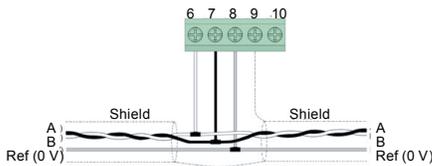


Figure A3: Example of connection of the accessory to the RS485 network

### 1 SAFETY INFORMATION

#### 1.1 SAFETY WARNINGS



#### NOTE!

- Only use the RS485 module (CFW100-CRS485) on WEG CFW100 series inverters.
- It is recommended reading the CFW100 user's manual before installing or operating this accessory.
- The content of this guide provides important information for the full understanding and proper operation of this module.

#### 1.2 PRELIMINARY RECOMMENDATIONS



#### ATTENTION!

- Always disconnect the general power supply before connecting or disconnecting the accessories of the CFW100 frequency inverter.
- Wait for at least 10 minutes for the full discharge of the inverter.

### 5 CONFIGURATIONS

The RS485 interface connections must be done on the connector as per [Table 1](#)

Table 1: Connector signals of the RS485 interface

Connector	Description
6	RS485-B RS485 (Terminal B)
7	RS485-A RS485 (Terminal A)
8	0V Reference 0V
9	PE Grounding connection
10	-

The location of the DIP switch to select the RS485 network termination can be better viewed in [Figure A2](#) and it must be configure as per [Table 2](#). [Figure A3](#) shows a connection example of the CFW100-CRS485 accessory to a RS485 network. The connection complies with the directions of the user's manual of the Modbus RTU for the CFW100.

Table 2: Configuration of the switches to configure the RS485

Communication	Switch	Switch Setting	Option
RS485	S1(*)	S1.1 = OFF and S1.2 = OFF	RS485 termination off
		S1.1 = ON and S1.2 = ON	RS485 termination on(**)

(\*) Any other combination of the switches is not allowed.

(\*\*) It is recommended to use this termination with cables longer than 3 m.

The CFW100-CRS485 module has the necessary resources to perform setting, command and monitoring of the inverter by means of the WPS software - WEG Programming Suite ([www.automationdirect.com](http://www.automationdirect.com)). For further details, refer to chapter 7 of the user's manual of the CFW100.



#### IMPORTANT NOTE!

- The mini USB connector (see [Figure A2](#)) is used for communication with the CFW100-KHMIR kit only.
- The use of the mini USB connector for other connections is not permitted.
- For PC to USB Connections to the CFW100 use the CFW100-CUSB Module only.



**WARNING: DO NOT USE THIS USB PORT FOR ANY PC CONNECTIONS FOR ANY REASON, AS IT MAY VERY WELL DAMAGE THE DRIVE AND YOUR PC. IT IS FOR CONNECTION OF THE REMOTE KEYPAD KIT CFW100-KHMIR ONLY.**



**Recommended RS-485 cable: Belden 9842, AutomationDirect L19954 series, or equivalent.**

## AUTOMATIONDIRECT PLCs AS MODBUS MASTER

### COMMUNICATION CABLE CONNECTIONS

Serial Modbus-capable AutomationDirect PLCs can communicate with CFW100 drives which have an optional communication card installed.

Serial Modbus control is easier to accomplish from a PLC that supports dedicated Modbus messaging. [Older PLCs may require programming to construct the Modbus strings.] We recommend PLCs with dedicated Modbus serial commands: CLICK (with RS-485 ports), P1000, P2000, P3000, BRX/Do-more, DirectLogic (DL06 or D2-260). Other PLC-Drive connectivity is possible: Please refer to the “Typical ADC PLC to CFW100 Serial Connectivity Matrix” below.

### Typical ADC PLC to WEG CFW100 RS-485 Serial Communications Connectivity

Typical ADC PLC to WEG CFW100 RS-485 Serial Communications Connectivity Matrix					
Recommended PLC Connectivity			Communication	Direct Cable	CFW100 Port Type
PLC	Port #	Port Type			
<b>CLICK</b>	3	3 screw terminals	RS-485	L19954 cable	CFW100-CRS485  screw terminals  A(-) B(+) Ref(0V)
<b>D2-260</b>	2	HD15	RS-485	D2-DSCBL-2	
<b>DL06</b>	2	HD15	RS-485	D2-DSCBL-2	
<b>BRX/Do-more</b>	RS-485	3 screw terminals	RS-485	L19954 cable	
<b>Do-more H2-DM1</b>	RS-232	RJ12	RS-232 to RS-485	FA-ISOCOCON with L19954 cable	
<b>P2-550</b>	RS-485	3 screw terminals	RS-485	L19954 cable	
<b>P3-530</b>	RS-485	3 screw terminals	RS-485	L19954 cable	
<b>P3-550</b>	RS-485	3 screw terminals	RS-485	L19954 cable	
<b>P3-550E</b>	RS-485	3 screw terminals	RS-485	L19954 cable	
<b>Other PLC Connectivity</b>			–	–	
<b>D2-250-1</b>	2	HD15	RS-485	D2-DSCBL-2	
<b>D4-450/D4-454</b>	1	DB25	RS-232 to RS-485	FA-ISOCOCON with L19954 cable	
<b>DL05</b>	2	RJ12	RS-232 to RS-485	FA-ISOCOCON with L19954 cable	
<b>DL06 + DCM</b>	2	HD15	RS-485	D2-DSCBL-2	
<b>Do-more H2-DM1 + H2-SERIO-4</b>	3	5 screw terminals	RS-485	L19954 cable	
<b>Do-more T1H-DM1</b>	RS-232	RJ12	RS-232 to RS-485	FA-ISOCOCON with L19954 cable	
<b>P2-SCM</b>	4	4 screw terminals	RS-485	L19954 cable	
<b>P3-SCM</b>	4	4 screw terminals	RS-485	L19954 cable	

**RS-232C TO RS-485 CONVERSION**

An RS-485 network cable can span up to 1000 meters (4000 feet). However, many AutomationDirect PLCs have only RS-232C communication ports and require an FA-ISOCON (RS-232C to RS-422/485 network adapter) in order to make an RS-485 connection.



If an FA-ISOCON module is used, set the module DIP switches as required. Refer to the FA-ISOCON manual for more detailed information.

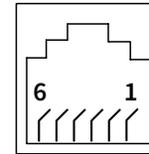
**FA-ISOCON Switch Settings:**

- S21–S23: OFF, ON, ON (19200 baud)
- S24–S27: OFF (Automatic Network Transmit Enable)
- Terminate: ON (end of run term resistors)
- Bias (2): ON (end of run bias resistors)
- 1/2 DPX (2): ON (RS-485 TXD/RXD jumpers)

**Helpful Hint:** Some applications require that the FA-ISOCON baud rate is set faster than the drive/network baud rate.

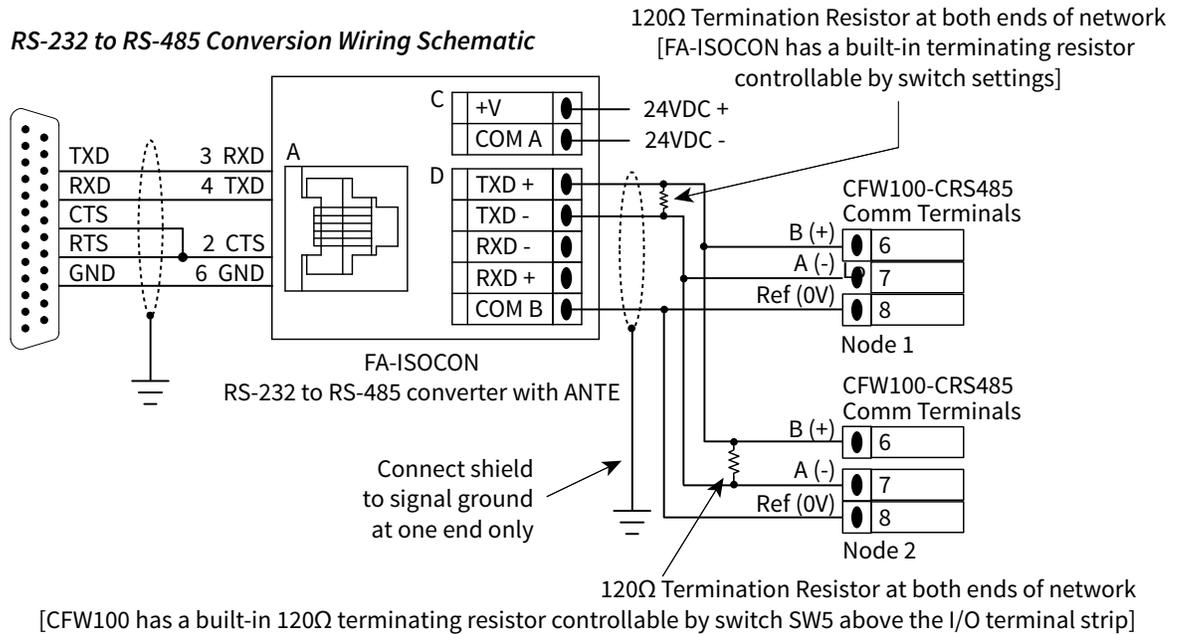
**FA-ISOCON Wiring**

**FA-ISOCON RJ-12 Serial Comm Port A RS-232 Input Port**



- 1: Signal Ground
- 2: CTS (input)
- 3: RXD (input)
- 4: TXD (output)
- 5: +5VDC in
- 6: Signal Ground

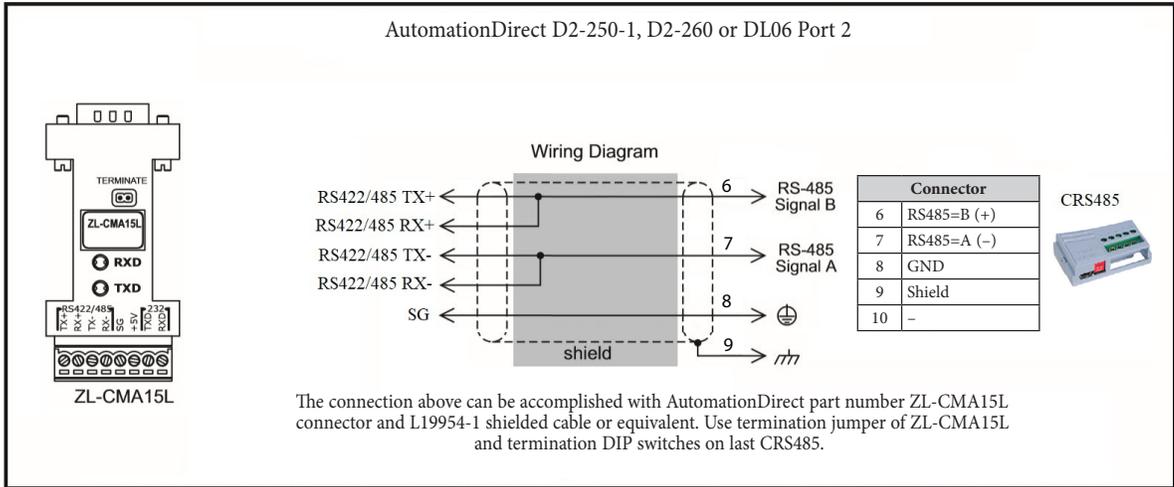
**RS-232 to RS-485 Conversion Wiring Schematic**



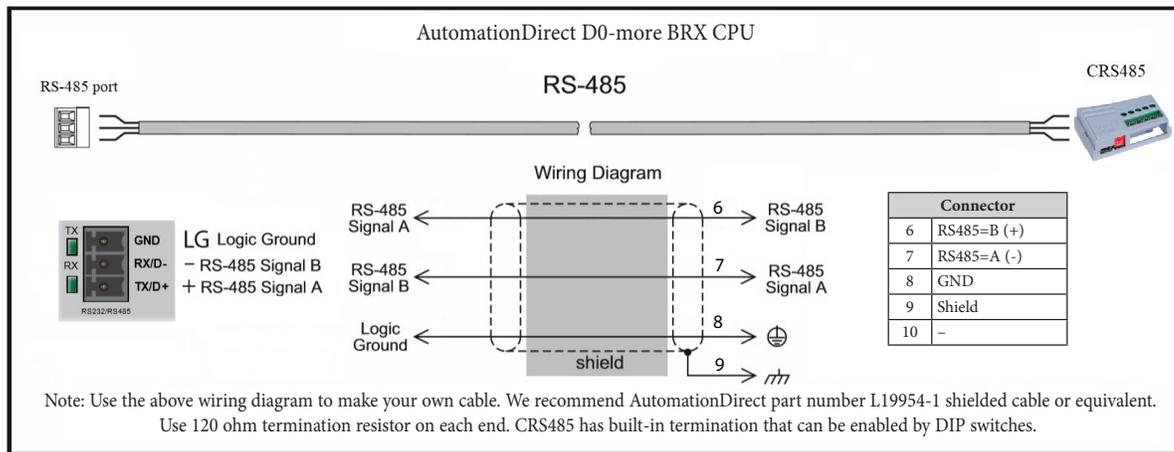
For information regarding configuration of AutomationDirect PLCs or other PLCs, please refer to the applicable PLC user manual for your application.



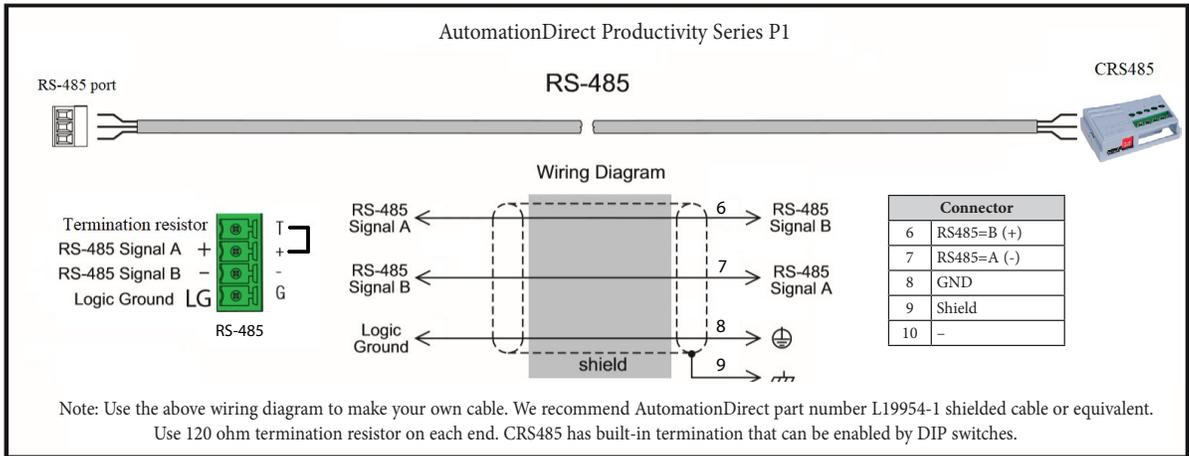
**DIRECTLOGIC SERIES D2-250-1, D2-260, DL06 PORT 2 VIA RS-485**



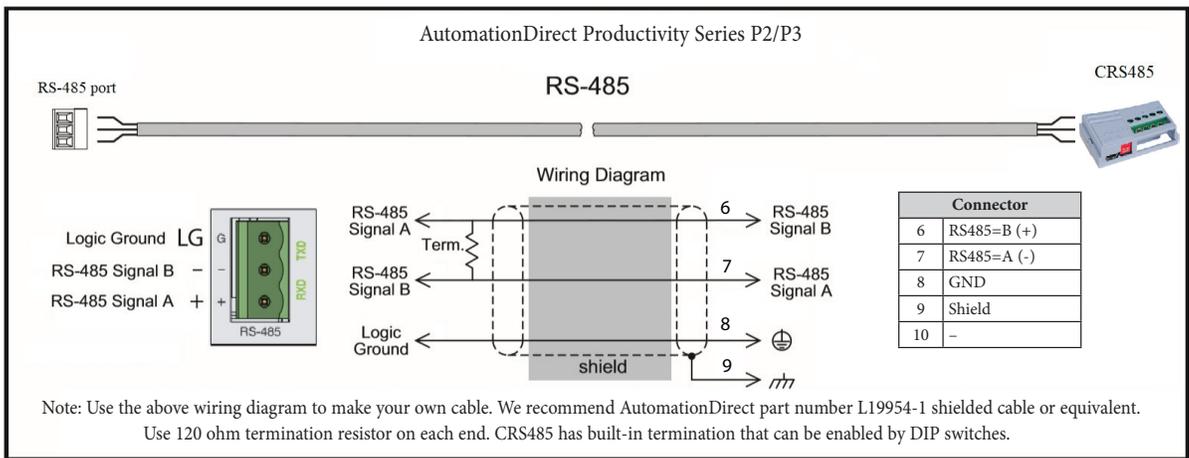
**DO-MORE BRX SERIES VIA RS-485**



**PRODUCTIVITY SERIES P1 VIA RS-485**



**PRODUCTIVITY SERIES P2/P3 VIA RS-485**



**AUTOMATIONDIRECT PLC EXAMPLE PROGRAMS FOR WEG CFW100 AC DRIVE**

Example programs for various AutomationDirect PLCs are available for free download from AutomationDirect: <https://support.automationdirect.com/examples.html>.  
 Also, an example CLICK PLC ladder diagram is show in the following section.

**CLICK PLC EXAMPLE PROGRAM FOR WEG CFW100 AC DRIVE**

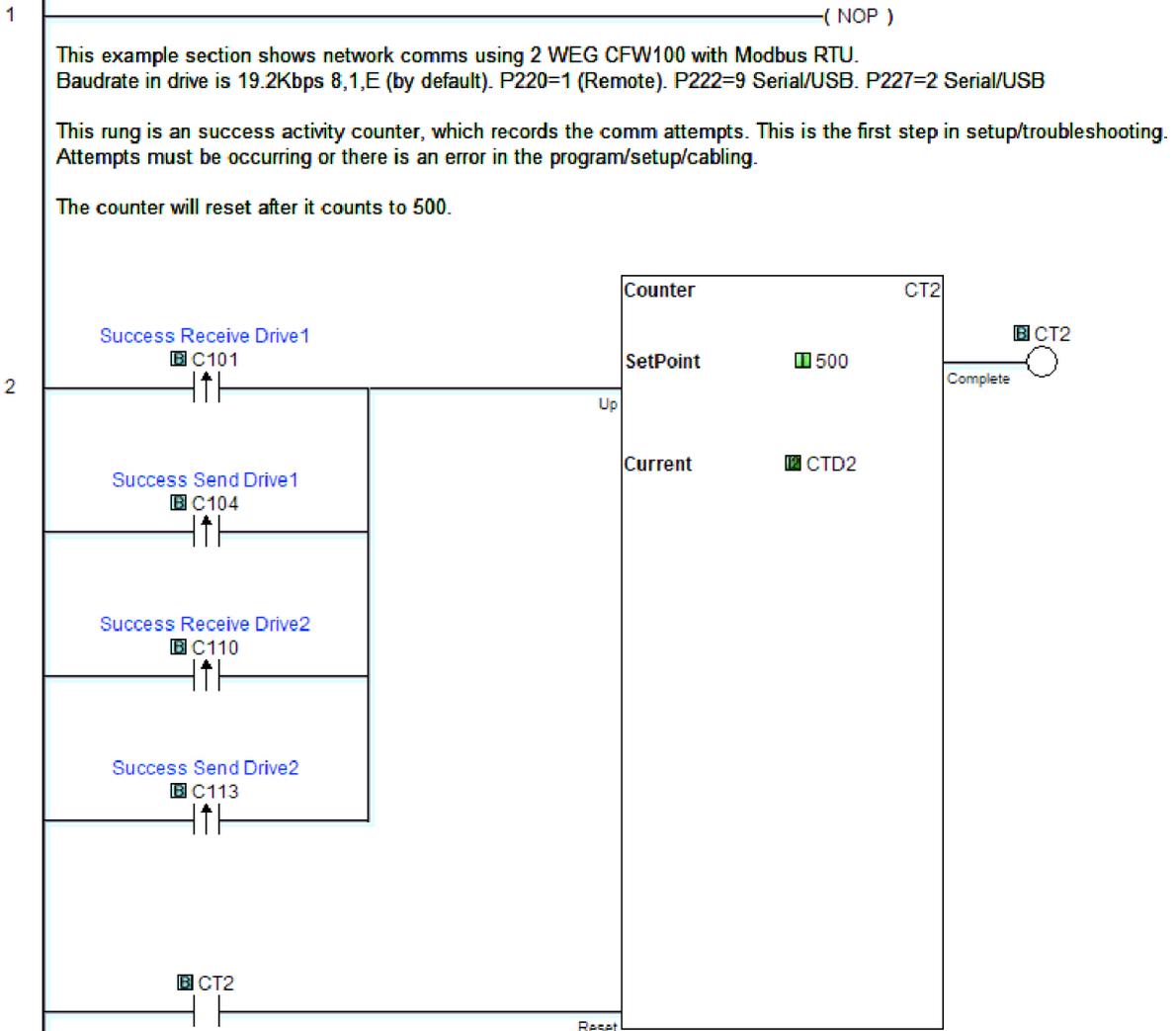
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**CLICK PLC Example Program for WEG CFW100 AC Drive**

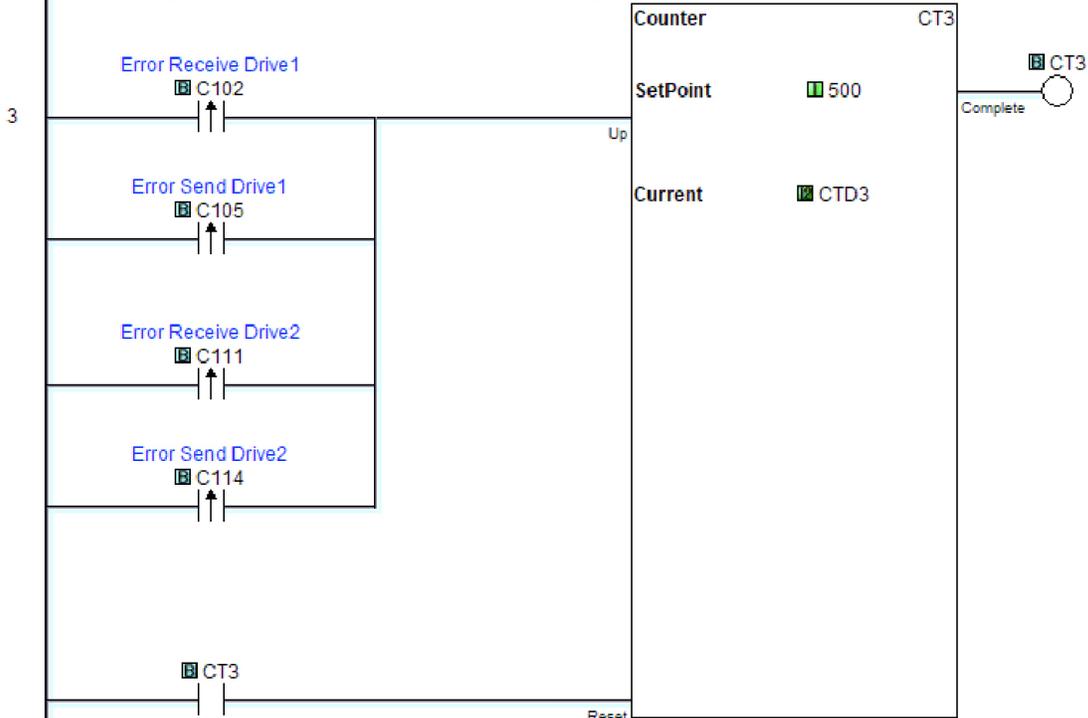
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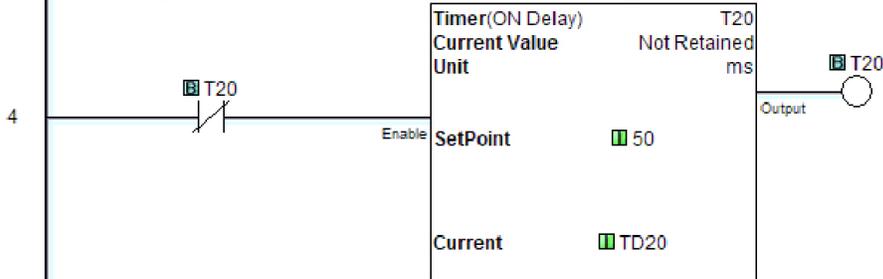
(program continued next page)

**CLICK PLC Example Program for WEG CFW100 AC Drive (continued)**

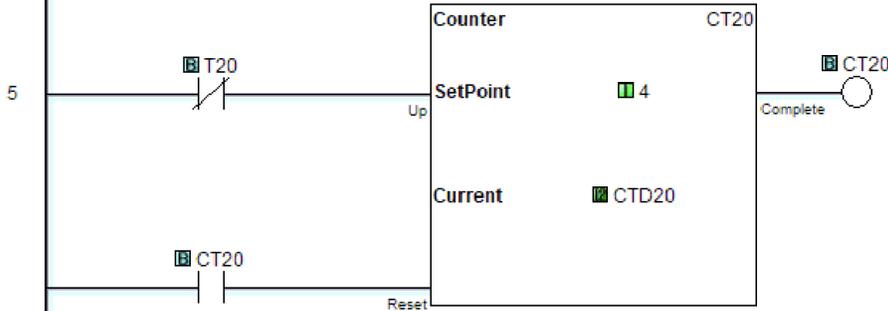
This rung is an Error counter, which records the comm attempts. This is the first step in setup/troubleshooting. If number is increasing there is an error in the program/setup/cabling



This timer generates the "heart beat" for the communication cycle. In this example baudrate is 19.2Kbps

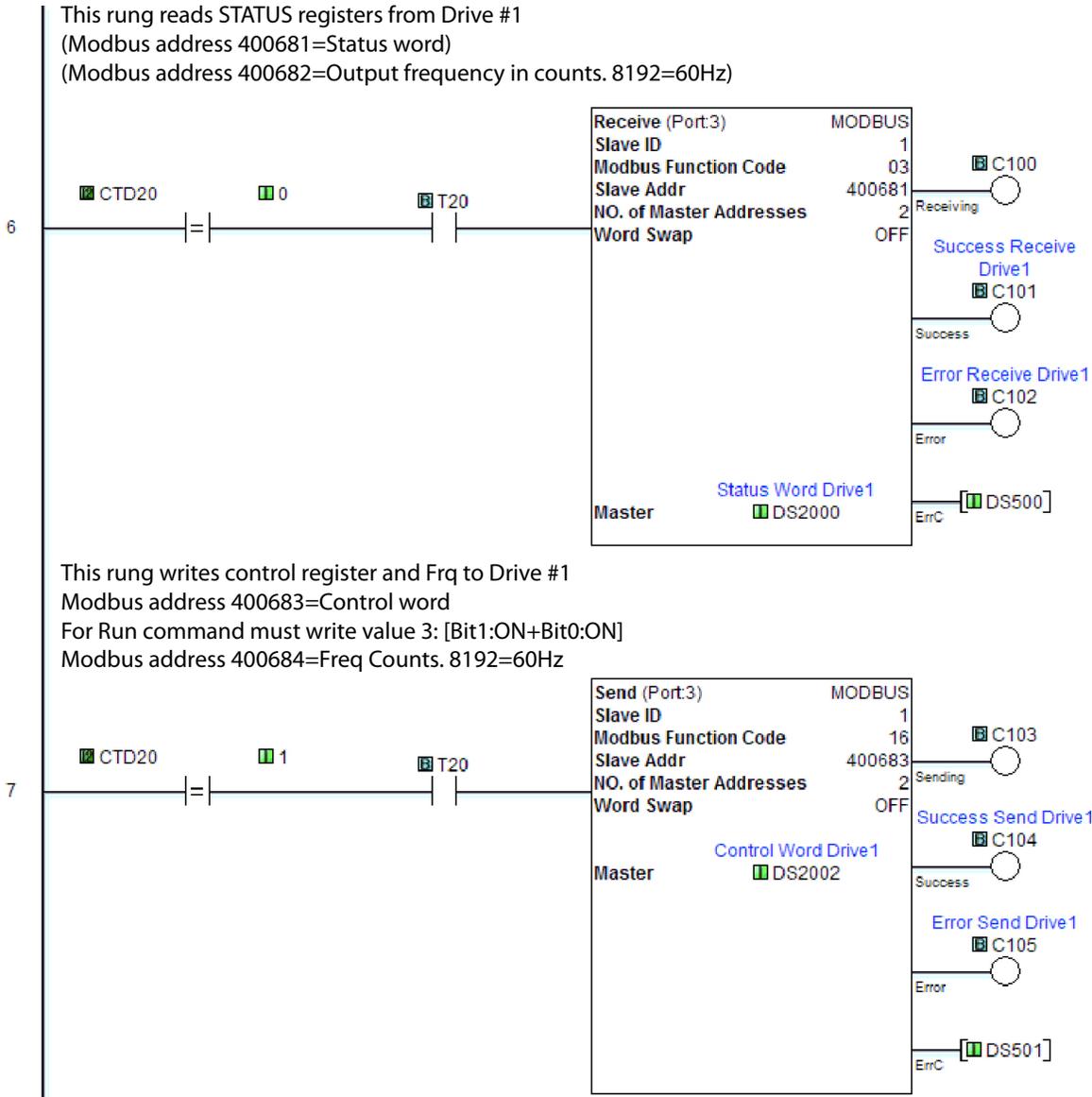


This rung generates the sequence for the communication. Every timer T20 bit done will increase the counter value. The setpoint of the timer is 2 times the number of drives. In this case the value is 4 because is for 2 drives.



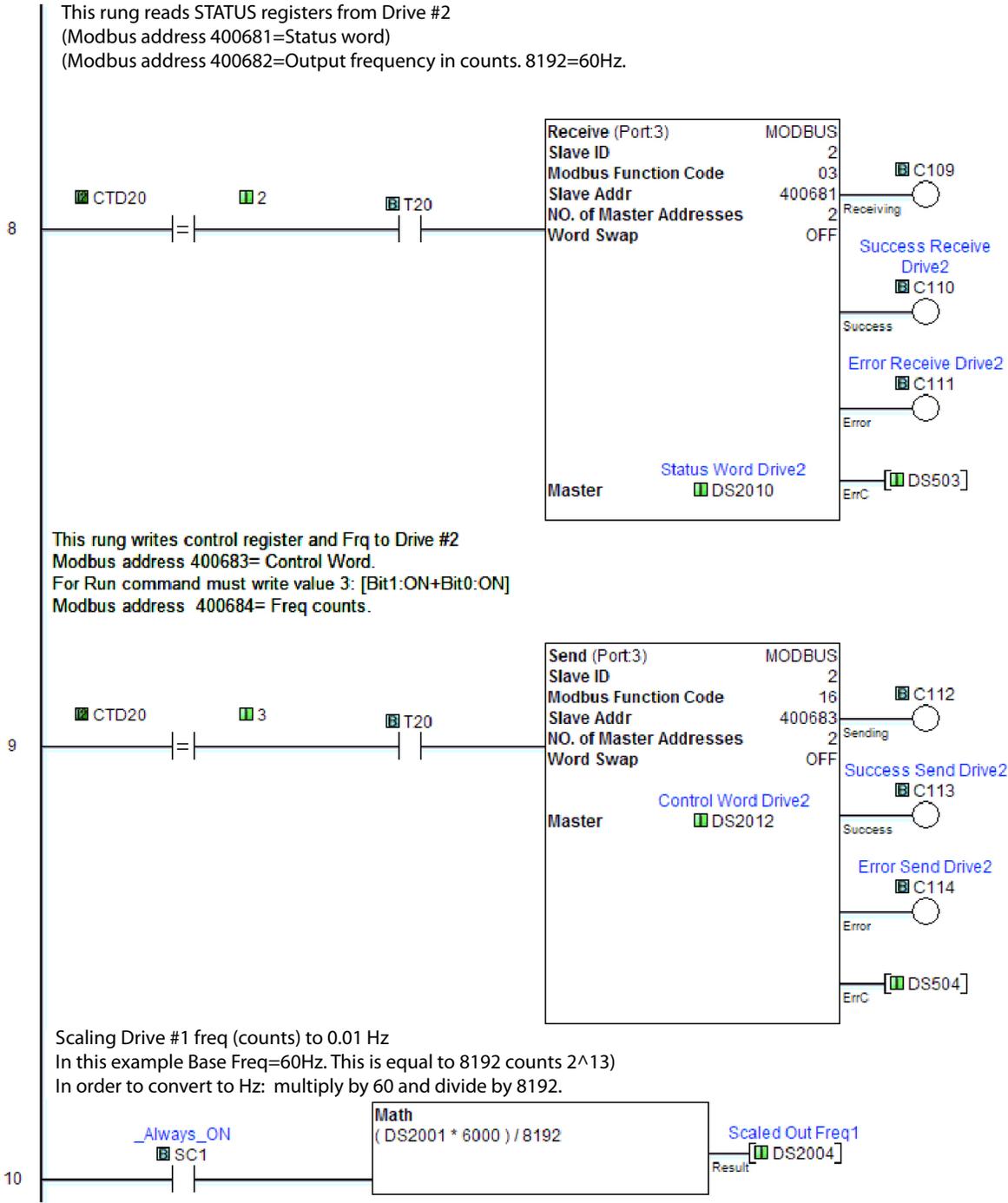
*(program continued next page)*

**CLICK PLC Example Program for WEG CFW100 AC Drive (continued)**



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**CLICK PLC Example Program for WEG CFW100 AC Drive (continued)**



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**CLICK PLC Example Program for WEG CFW100 AC Drive (continued)**

