



WEG CFW300 AC DRIVES SERIAL COMMUNICATIONS QUICK-START GUIDE

NOTE: This Quick-Start guide is intended for the sole purpose of establishing communications connections between WEG CFW300 AC Drives and AutomationDirect programmable controllers, or between the CFW300 and the USB port of a personal computer. Please refer to WEG CFW300 documents for specifications and instructions for using the WEG CFW300 AC Drives.

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COMMUNICATIONS PARAMETERS SUMMARY

A summary of the WEG CFW300 AC drives Communications Parameters is listed below.

NOTE: Refer to the WEG CFW300 Frequency Inverter Programming Manual and the Modbus RTU User's Manual for a complete listing of all CFW300 AC drives parameters, including details and Modbus addresses.

SUMMARY – SERIAL COMMUNICATION PARAMETERS

WEG CFW300 Serial Communication Parameters Summary ¹⁾						
Parameter ²⁾	Range	Setting		Modbus Address		
		Comm	Default ³⁾	Hex	Modicon ⁴⁾	
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 CFW300 is 40001 + the Parameter Address; Example: P222 Modicon Modbus address would be 40001 + 222 = 40223						
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)						
General Parameters						
P000	Access to Parameters	0 to 9999		1	0	40001
P001	Speed Reference	0 to 9999	RO	RO	1	40002
P002	Output Speed (Motor)	0 to 9999	RO	RO	2	40003
P003	Motor Current	0.0 to 40.0 A	RO	RO	3	40004
P004	DC Link Voltage (Ud)	0 to 524 V	RO	RO	4	40005
P005	Output Frequency (Motor)	0.0 to 400.0 Hz	RO	RO	5	40006
♦ P200	Password	0 = Inactive 1 = Active 2 to 9999 = New Password		0	C8	40201
Parameters necessary to communicate with the drive using module CFW-CRS232 or CFW-CRS485						
♦ P220	LOC/REM Selection Source ⁵⁾	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	40221
♦ P222	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	40223
(table continued next page)						

WEG CFW300 Serial Communication Parameters Summary¹⁾ – (continued)						
Parameter²⁾	Range	Setting		Modbus Address		
		Comm	Default³⁾	Hex	Modicon	
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						
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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)						
♦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	40227
♦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	40228
♦P308	Serial Address	1 to 247	1	1	134	40309
♦P310	Serial Baud Rate ⁶⁾	0 = 9600 bits/s 1 = 19200 bits/s 2 = 38400 bits/s	1	1	136	40311
♦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	40312
♦P312	Serial Protocol	0, 1 = reserved 2 = Slave Modbus RTU 3, 4 = reserved 5 = Master Modbus RTU	2	2	138	40313
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	40314
♦P314	Serial Watchdog	0.0 to 999.0	0.0	0.0	13A	40315
P316	Serial Interface Status	0 = Inactive 1 = Active 2 = Watchdog Error	RO	RO	13C	40317

(table continued next page)

WEG CFW300 Serial Communication Parameters Summary¹⁾ – (continued)

Parameter ²⁾	Range	Setting		Modbus Address		
		Comm	Default ³⁾	Hex	Modicon	
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 CFW300 is 40001 + the Parameter Address; <i>Example: P222 Modicon Modbus address would be 40001 + 222 = 40223</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)						
P680	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	40681
P681	Motor Speed in 13 bits	0 to FFFF (hex)	RO	RO	2A9	40682
P682	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	40683
P683	Serial/USB Speed Reference	0 to FFFF (hex)	RO	RO	2AB	40684

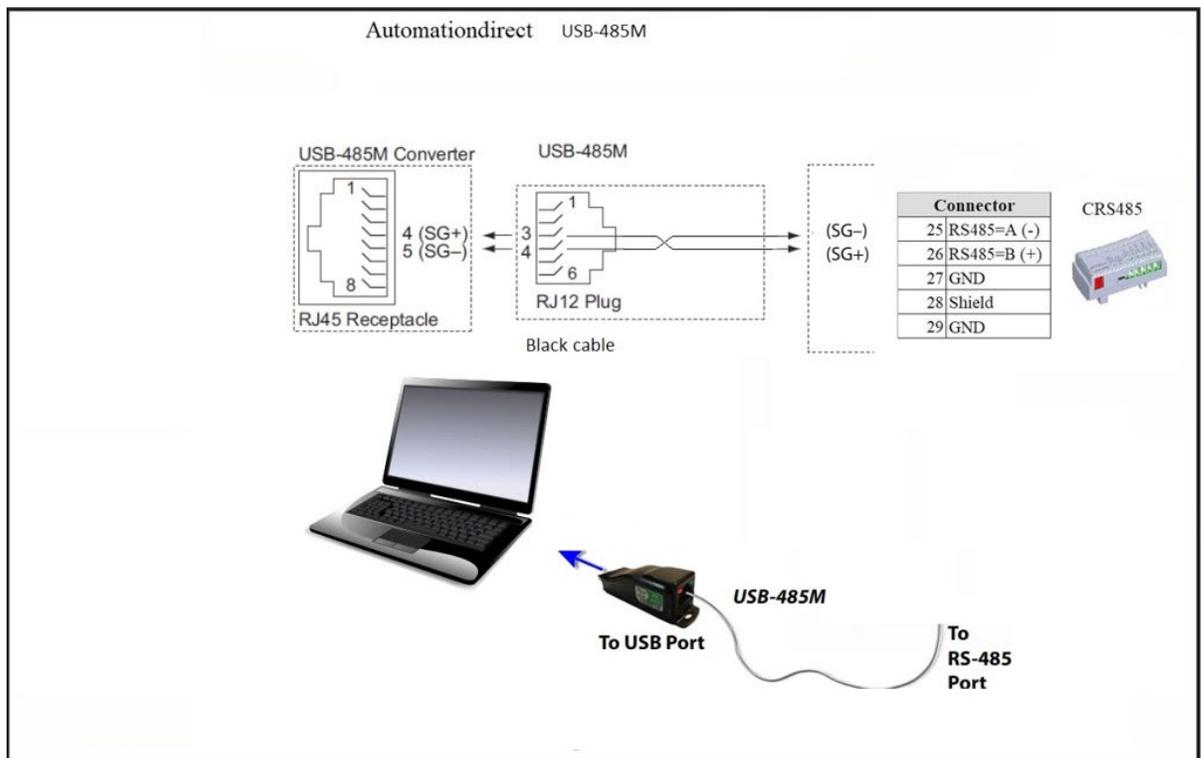
EXPLANATION OF SCALING/COUNT FREQUENCY COMMAND/FEEDBACK

- When using WEG CFW300 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 (2¹³). 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 CFW300 USING AUTOMATIONDIRECT CABLE USB-485M

An AutomationDirect cable, part number USB-485M, provides a quick and easy method of communicating to a WEG CFW300 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 CFW300 AC Drives.



CONNECTING COMMUNICATION CABLES TO CFW300 AC DRIVES



The CFW300-CRS485 drive communication module includes a DIP switch that will switch in a 120Ω terminating resistor for the RS-485 network. An external terminating resistor is not required for the drive end. An external termination resistor may be required on the other end of RS-485 network; especially on long runs. Select resistors that match the impedance of the cable (between 100Ω and 500Ω).

The CFW300 serial communication port is an RS-485 input. Please note that terminals A(-) and B(+) are shared with the USB connector. CFW300 to CFW300 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](#)).

CFW300-CRS485 SERIAL COMMUNICATIONS MODULE

1 SAFETY INFORMATION

1.1 SAFETY WARNINGS



NOTE!

- Only use the RS485 module (CFW300-CRS485) on WEG CFW300 series inverters.
- It is recommended reading the CFW300 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 CFW300 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
25	RS485: A(-) RS485 (Terminal A)
26	RS485: B(+) RS485 (Terminal B)
27	GND Reference 0 V
28	Shield Cable shield
29	GND Reference 0 V

The location of the DIP switch to select the RS485 network termination can be better viewed in [Figure A2](#) and it must be configured as per [Table 2](#). [Figure A3](#) shows a connection example of the CFW300-CRS485 accessory to a RS485 network. The connection complies with the directions of the user's manual of the Modbus RTU for the CFW300.

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.

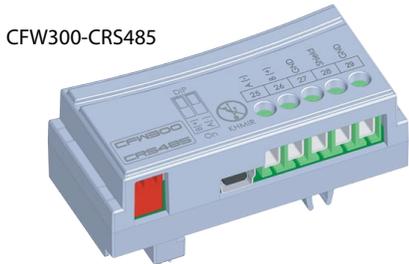
(**) It is recommended to use this termination with cables longer than 3 m.

The CFW300-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). For further details, refer to chapter 7 of the user's manual of the CFW300.



NOTE!

- The mini USB connector (see [Figure A2](#)) is used for communication with the CFW300-KHMIR kit only.
- The use of the mini USB connector for other connections is not permitted.



CFW300-CRS485

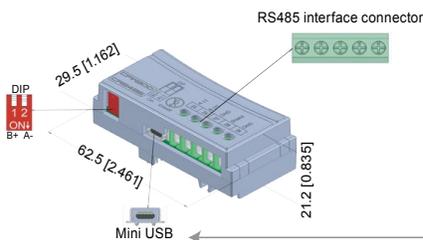


Figure A2: CFW300-CRS485 dimensions in mm [in] and connectors location

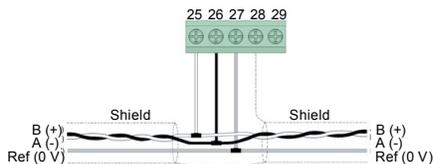


Figure A3: Example of connection of the accessory to the RS485 network



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 CFW300-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 CFW300 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 CFW300 Serial Connectivity Matrix” below.

Typical ADC PLC to WEG CFW300 RS-232 Serial Communications Connectivity

Typical ADC PLC to WEG CFW300 RS-232 Serial Communications Connectivity Matrix					
Recommended PLC Connectivity			Communication	Direct Cable	CFW300 Port Type
PLC	Port #	Port Type			
CLICK	2	RJ12	RS-232	ZL-RJ12-CBL-2P	CFW300-CRS232 screw terminals
D2-260	2	HD15		D2-DSCBL-2	
DL06	2	HD15		D2-DSCBL-2	
BRX/Do-more	RS-232	3 screw terminals		L19772-1 cable	
Do-more H2-DM1	RS-232	RJ12		ZL-RJ12-CBL-2P	
P1-540	RS-232	RJ12		ZL-RJ12-CBL-2P	
P2-550	RS-232	RJ12		ZL-RJ12-CBL-2P	
P3-530	RS-232	RJ12		ZL-RJ12-CBL-2P	
P3-550	RS-232	RJ12		ZL-RJ12-CBL-2P	
P3-550E	RS-232	RJ12		ZL-RJ12-CBL-2P	
Other PLC Connectivity			–	–	
D2-250-1	2	HD15	RS-232	D2-DSCBL-2	RX TX Ref(0V)
D4-450/D4-454	2	RJ12		ZL-RJ12-CBL-2P	
DL05	2	RJ12		ZL-RJ12-CBL-2P	
DL06 + DCM	2	RJ12		ZL-RJ12-CBL-2P	
Do-more H2-DM1 + H2-SERIO-4	1,2	RJ12		ZL-RJ12-CBL-2P	
Do-more T1H-DM1	RS-232	RJ12		ZL-RJ12-CBL-2P	
P2-SCM	1,2,3	RJ12		ZL-RJ12-CBL-2P	
P3-SCM	1,2,3	RJ12		ZL-RJ12-CBL-2P	

Typical ADC PLC to WEG CFW300 RS-485 Serial Communications Connectivity

Typical ADC PLC to WEG CFW300 RS-485 Serial Communications Connectivity Matrix					
Recommended PLC Connectivity			Communication	Direct Cable	CFW300 Port Type
PLC	Port #	Port Type			
CLICK	3	3 screw terminals	RS-485	L19954 cable	CFW300-CRS485 screw terminals
D2-260	2	HD15	RS-485	D2-DSCBL-2	
DL06	2	HD15	RS-485	D2-DSCBL-2	
BRX/Do-more	RS-485	3 screw terminals	RS-485	L19954 cable	
Do-more H2-DM1	RS-232	RJ12	RS-232 to RS-485	FA-ISOCOCON with L19954 cable	
P2-550	RS-485	3 screw terminals	RS-485	L19954 cable	
P3-530	RS-485	3 screw terminals	RS-485	L19954 cable	
P3-550	RS-485	3 screw terminals	RS-485	L19954 cable	
P3-550E	RS-485	3 screw terminals	RS-485	L19954 cable	
Other PLC Connectivity			–	–	
D2-250-1	2	HD15	RS-485	D2-DSCBL-2	A(-) B(+) Ref(0V)
D4-450/D4-454	1	DB25	RS-232 to RS-485	FA-ISOCOCON with L19954 cable	
DL05	2	RJ12	RS-232 to RS-485	FA-ISOCOCON with L19954 cable	
DL06 + DCM	2	HD15	RS-485	D2-DSCBL-2	
Do-more H2-DM1 + H2-SERIO-4	3	5 screw terminals	RS-485	L19954 cable	
Do-more T1H-DM1	RS-232	RJ12	RS-232 to RS-485	FA-ISOCOCON with L19954 cable	
P2-SCM	4	4 screw terminals	RS-485	L19954 cable	
P3-SCM	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-ISOCAN (RS-232C to RS-422/485 network adapter) in order to make an RS-485 connection.



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

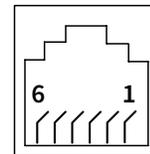
FA-ISOCAN Switch Settings:

- 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-ISOCAN baud rate is set faster than the drive/network baud rate.

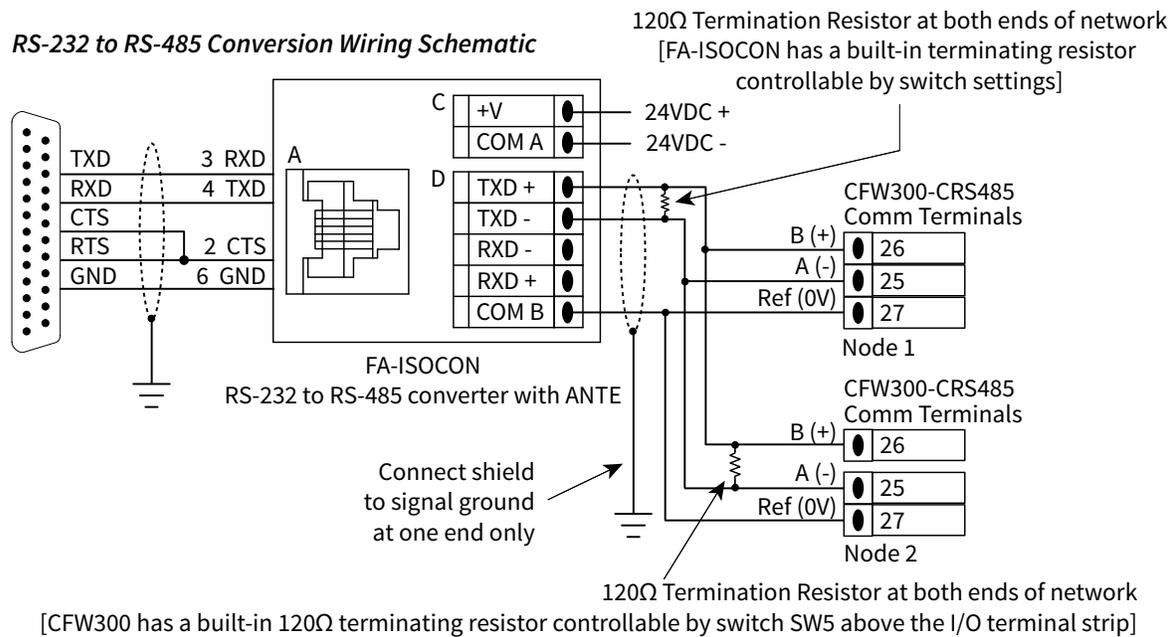
FA-ISOCAN Wiring

FA-ISOCAN 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



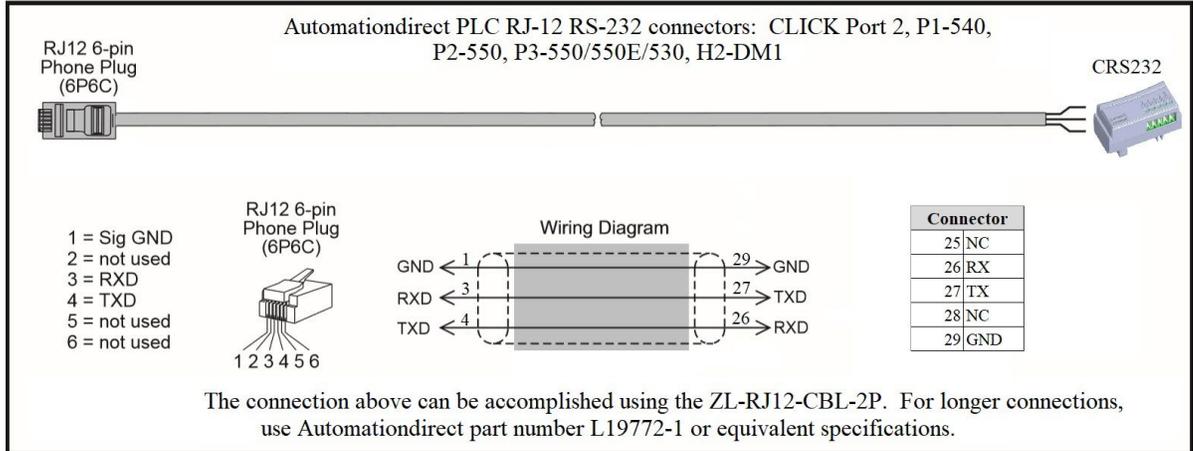
For information regarding configuration of AutomationDirect PLCs or other PLCs, please refer to the applicable PLC user manual for your application.

AUTOMATIONDIRECT PLC CABLE CONNECTIONS

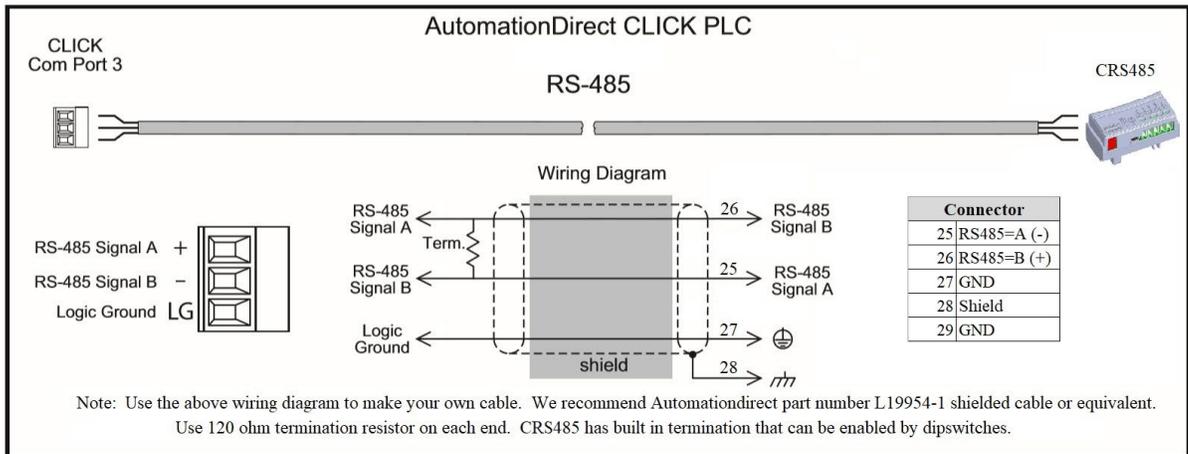
CLICK SERIES PORT 2,

DO-MORE SERIES H2-DM1

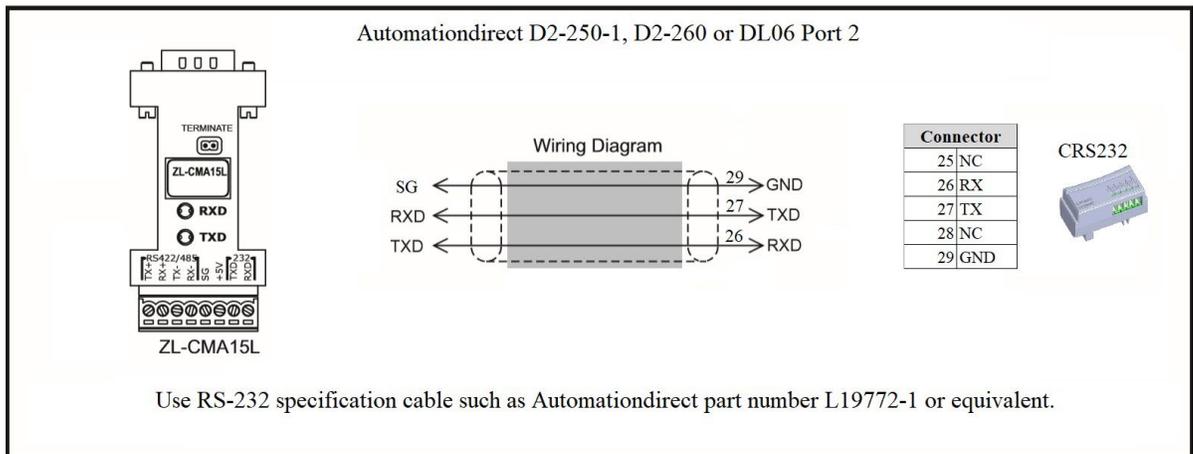
PRODUCTIVITY SERIES P1-540, P2-550, P3-530/550/550E VIA RS-232



CLICK SERIES PORT 3 VIA RS-485



DIRECTLOGIC SERIES D2-250-1, D2-260, DL06 PORT 2 VIA RS-232



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

Automationdirect D2-250-1, D2-260 or DL06 Port 2

Connector	
25	RS485=A (-)
26	RS485=B (+)
27	GND
28	Shield
29	GND

The connection above can be accomplished with Automationdirect part number ZL-CMA15L connector and L19954-1 shielded cable or equivalent. Use termination jumper of ZL-CMA15L and termination dipswitches on last CRS485.

DO-MORE BRX SERIES VIA RS-232

Automationdirect Do-more BRX CPU
RS-232

Connector	
25	NC
26	RX
27	TX
28	NC
29	GND

Use RS-232 specification cable such as Automationdirect part number L19772-1 or equivalent.

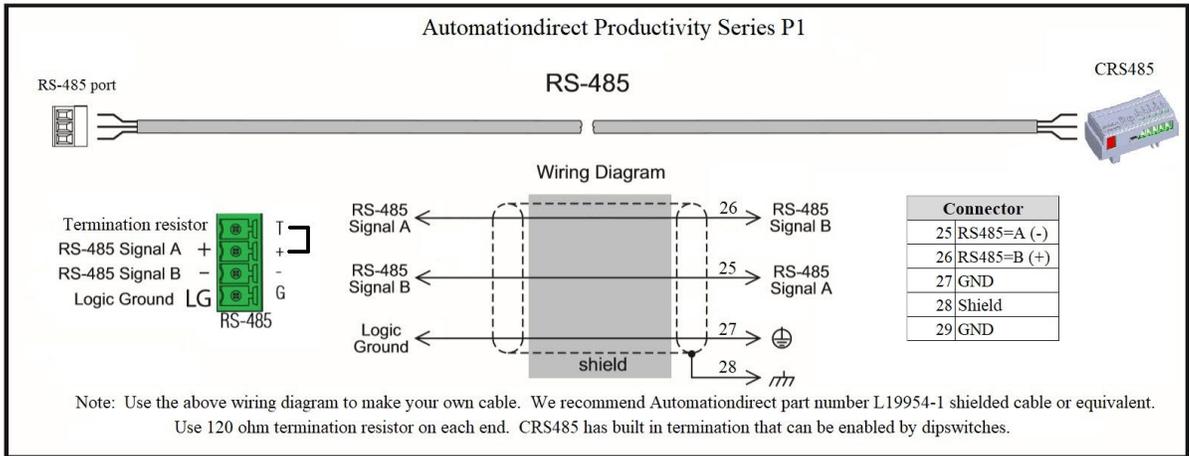
DO-MORE BRX SERIES VIA RS-485

Automationdirect Do-more BRX CPU
RS-485

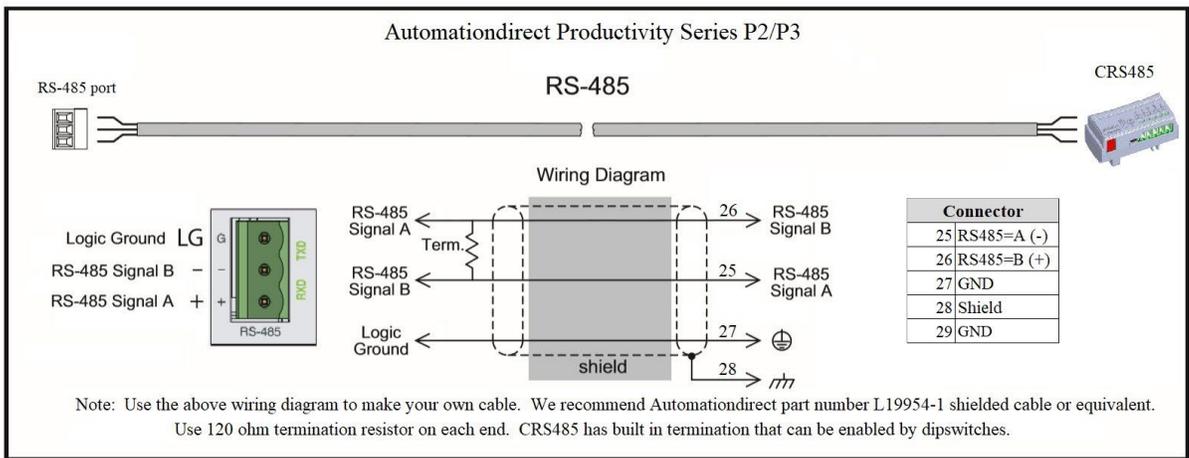
Connector	
25	RS485=A (-)
26	RS485=B (+)
27	GND
28	Shield
29	GND

Note: Use the above wiring diagram to make your own cable. We recommend Automationdirect part number L19954-1 shielded cable or equivalent. Use 120 ohm termination resistor on each end. CRS485 has built in termination that can be enabled by dipswitches.

PRODUCTIVITY SERIES P1 VIA RS-485



PRODUCTIVITY SERIES P2/P3 VIA RS-485



AUTOMATIONDIRECT PLC EXAMPLE PROGRAMS FOR WEG CFW300 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 CFW300 AC DRIVE

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CLICK PLC Example Program for WEG CFW300 AC Drive

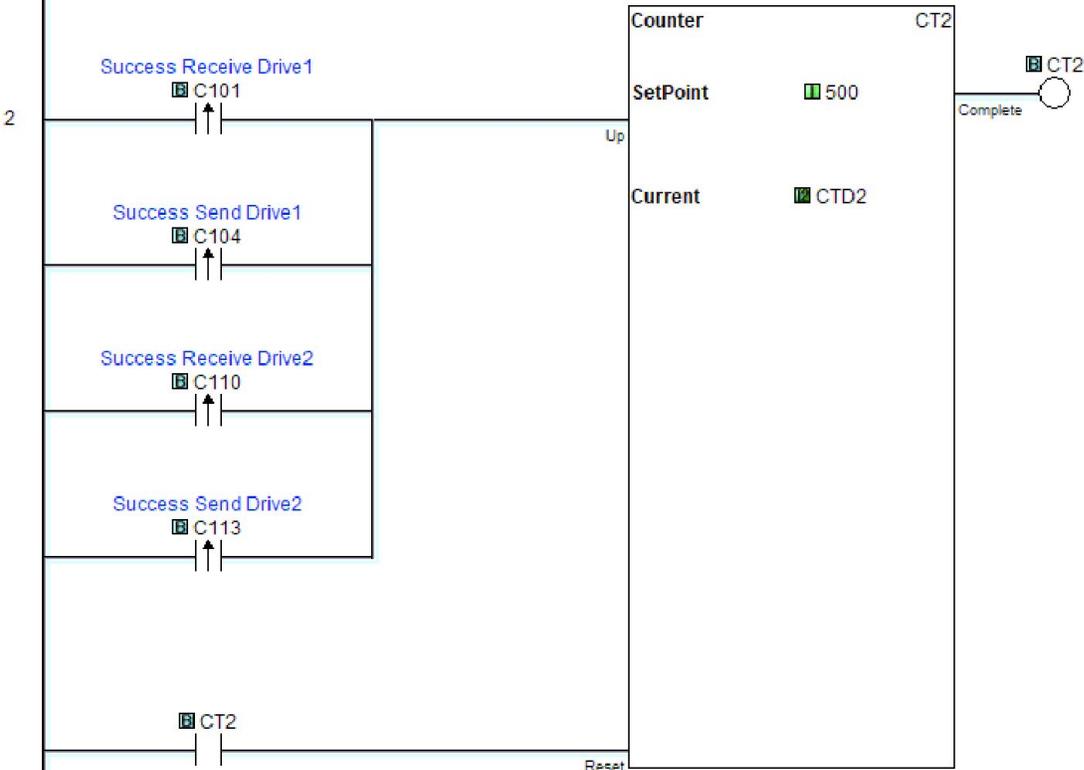
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1 _____ (NOP)

This example section shows network comms using 2 WEG CFW300 with Modbus RTU.
 Baudrate in drive is 19.2Kbps 8,1,E (by default). P220=1 (Remote). P222=9 Serial/USB. P227=2 Serial/USB

This rung is an success activity counter, which records the comm attempts. This is the first step in setup/troubleshooting. Attempts must be occurring or there is an error in the program/setup/cabling.

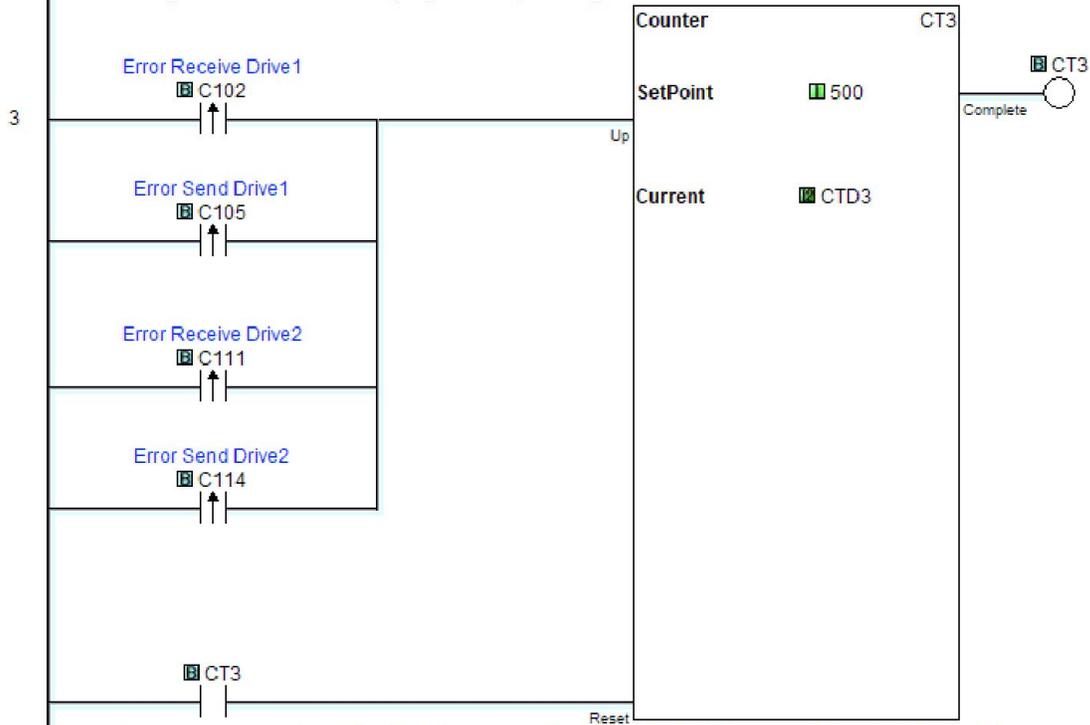
The counter will reset after it counts to 500.



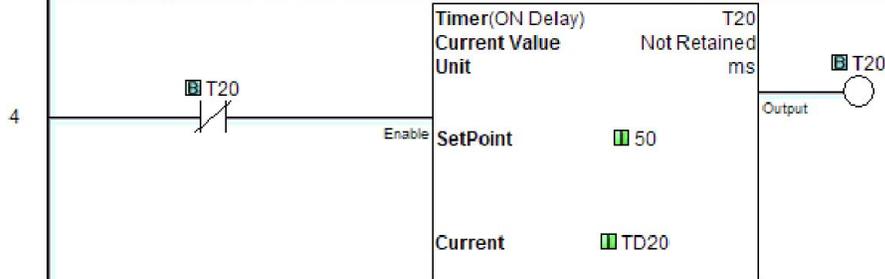
(program continued next page)

CLICK PLC Example Program for WEG CFW300 AC Drive (continued)

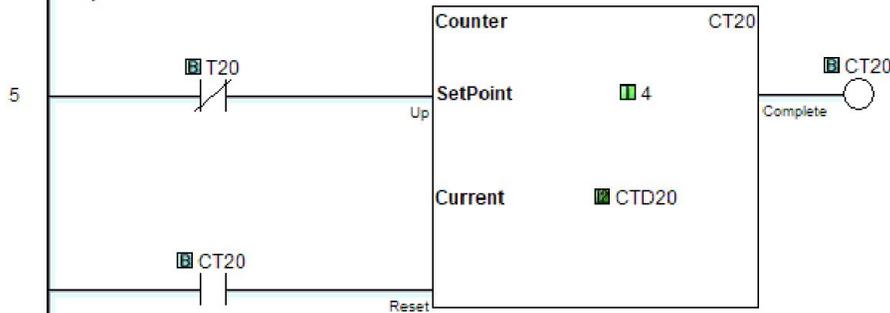
This rung is an Error counter, which records the comm attempts. This is the first step in setup/troubleshooting. If number is increasing there is an error in the program/setup/cabling



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

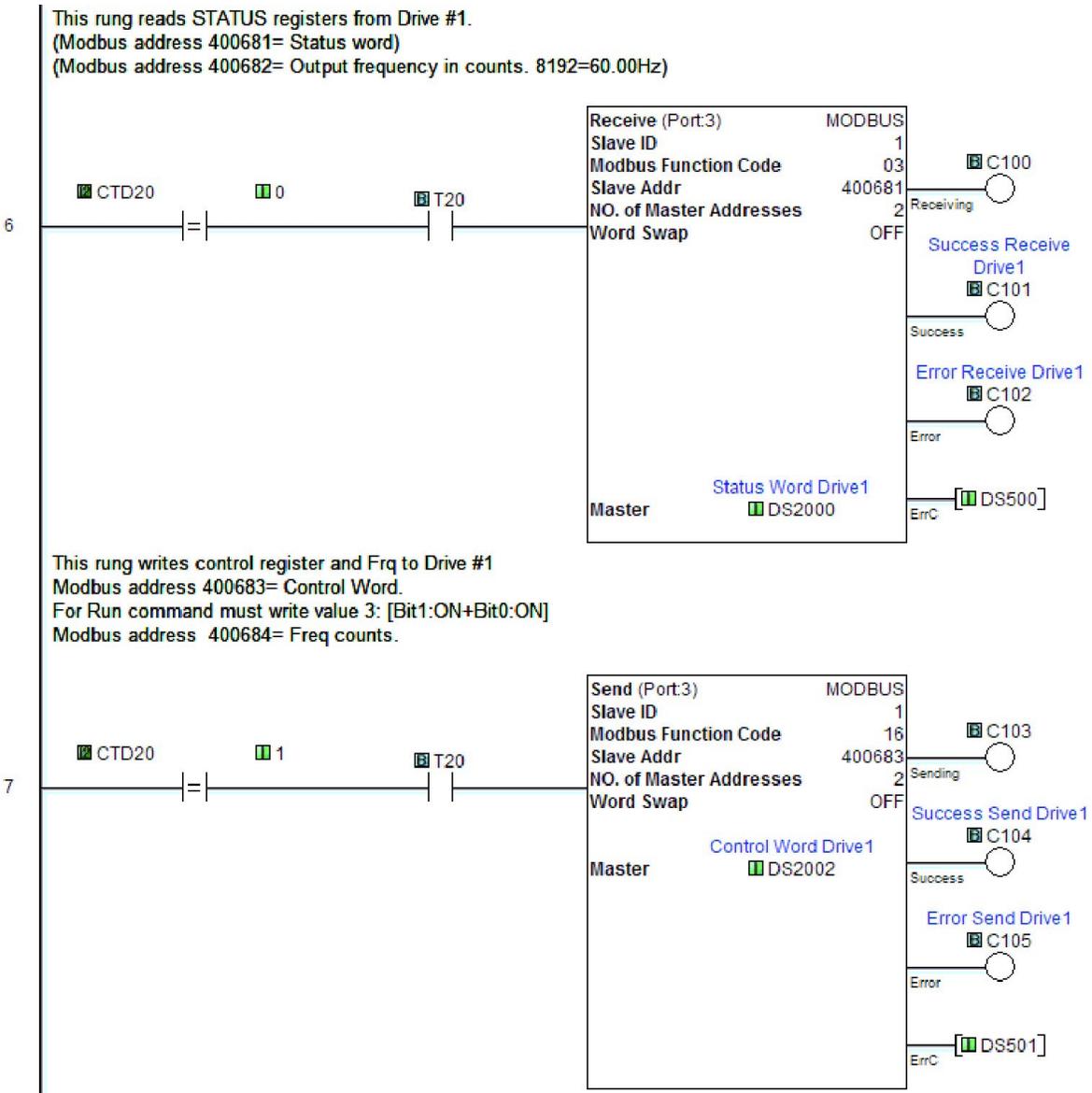


This rung generates the sequence for the communication. Every timer T20 bit done will increase the counter value. The setpoint of the timer is 2 times the number of drives. In this case the value is 4 because is for 2 drives.



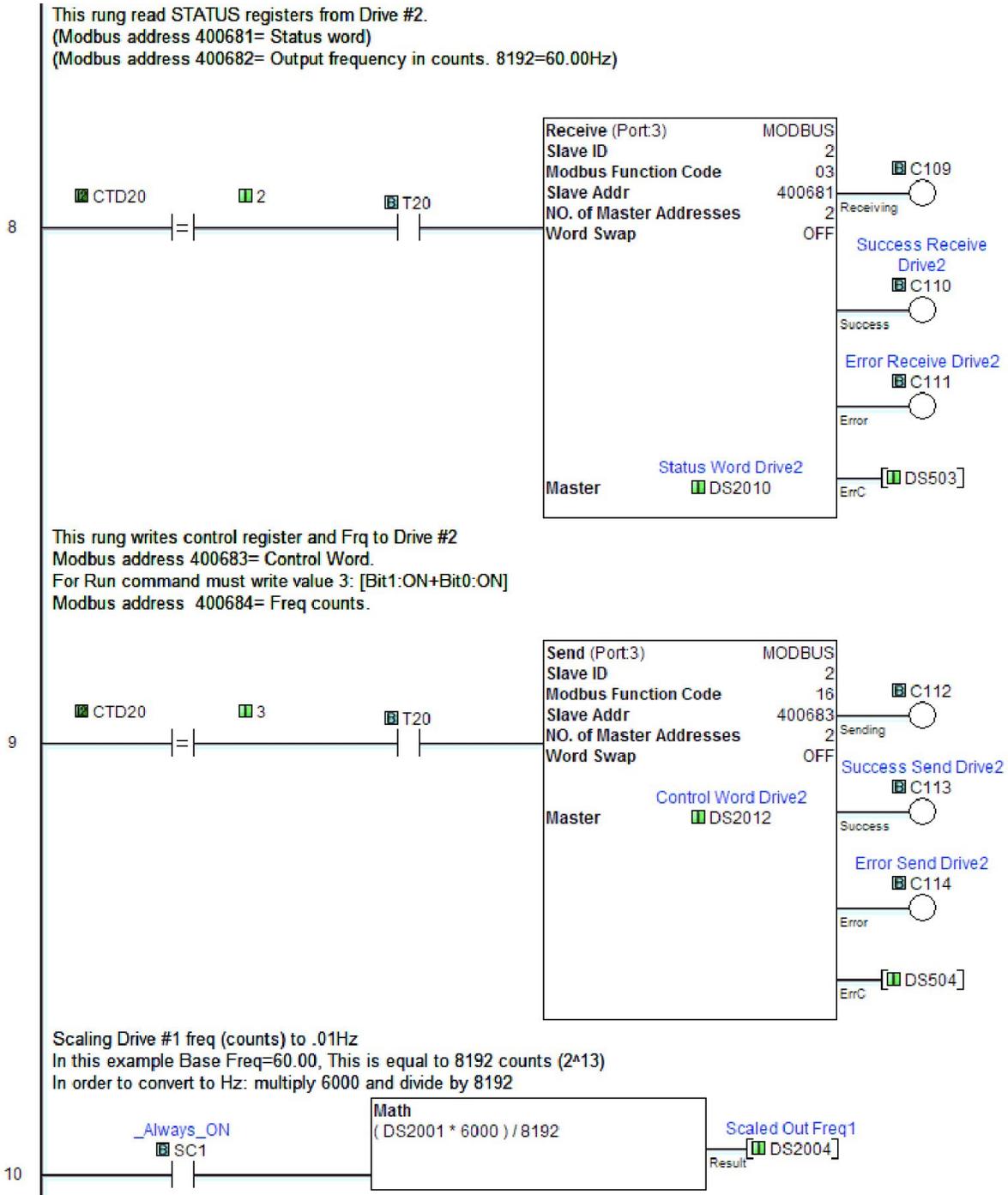
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CLICK PLC Example Program for WEG CFW300 AC Drive (continued)



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CLICK PLC Example Program for WEG CFW300 AC Drive (continued)



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CLICK PLC Example Program for WEG CFW300 AC Drive (continued)

